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DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

CHARLES D. WALCOTT, DIRECTOR

THE

RAMPART GOLD PLACER REGION ALASKA

BY

L. M. PRINDLE AND FRANK L. HESS

WASHINGTON

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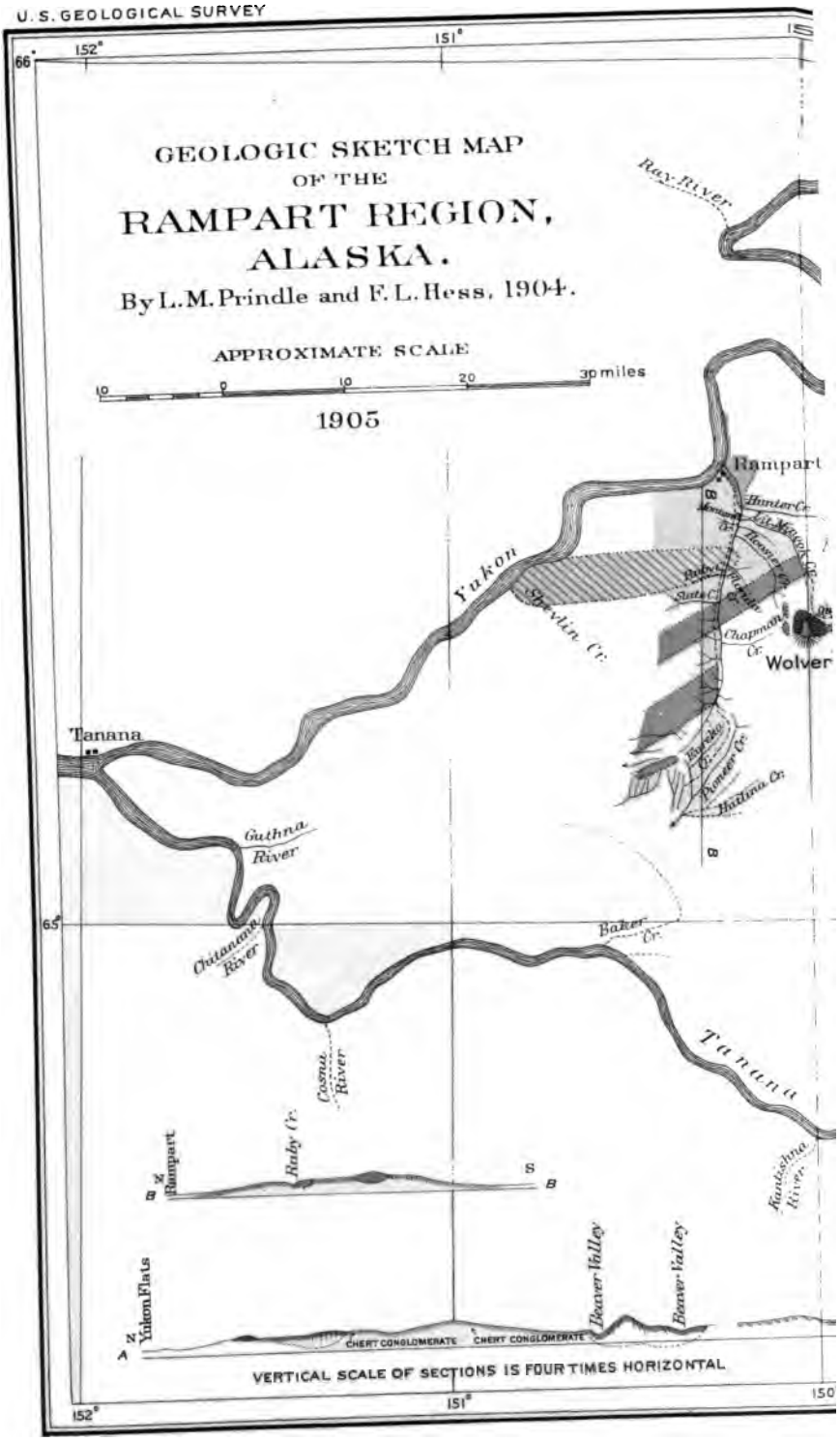

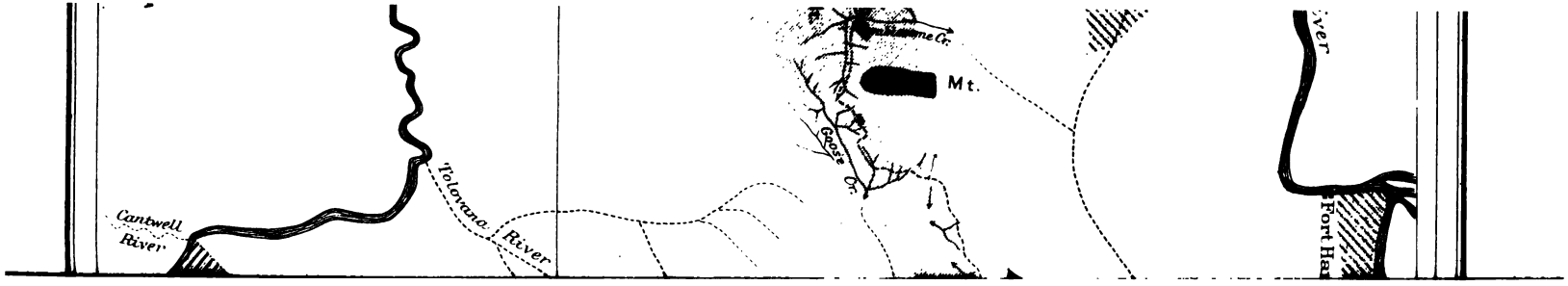
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Mt.
Goose Cr.
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THE RAMPART GOLD PLACER REGION, ALASKA.[a]

By L. M. PRINDLE and F. L. HESS.

GEOGRAPHY AND GEOLOGY.

By L. M. PRINDLE.

GENERAL STATEMENT.

The Rampart region is in the central part of Alaska, near the intersection of the one hundred and fiftieth meridian and the sixty-fifth parallel. It is in the western part of the large area—embracing approximately 40,000 square miles—delimited by Yukon and Tanana rivers and by the international boundary, 300 miles to the east, and is located where the distance in a north and south direction between the two rivers is hardly 50 miles (Pl. I).

The Rampart region is one of the four most important gold-producing regions in this interstream area. The Fortymile, near the boundary, the Birch Creek, and the Rampart regions are adjacent to the Yukon at intervals of about 140 miles westward from the boundary. The Fairbanks region, the most recently developed and at the present time the most productive, is in Tanana Valley about 12 miles north of the river and about 260 miles from its mouth. The Rampart region is about 80 miles northwest of the Fairbanks region, and all the creeks of present economic importance are within 30 miles of the Yukon and belong to the drainage systems of both Yukon and Tanana rivers.

The region has passed through many stages characteristic of the life of a placer camp. Some of the creeks were prospected as early as 1893 and became active producers by 1896, when the region became of equal prominence with the Fortymile and Birch Creek regions. Many were attracted by the favorable results, and during the winter of 1898–99 the town of Rampart, the supply point for the camp, contained about 1,500 people. After the preliminary stage of prospecting and the subsequent excitement of the boom days, with their excess of hopes and population, the camp settled down to the laborious existence of an average producer, influenced from time to time by the discoveries of gold in other portions of Alaska and rewarded occasionally by discoveries in its own territory. During the last two years discoveries have been made which have contributed to the permanence of the camp and illustrated the possibilities still existing in a region which has already been under investigation for several years. The recent introduction of hydraulic methods, too, entailing the expenditure of considerable capital, has given further importance to the locality, which during 1904 had a population of about 300 and a production of approximately $235,000.

[a] An abstract of this paper was published in Bull. U. S. Geol. Survey No. 259, pp. 104–119.

The towns of Eagle, Circle, and Rampart, on Yukon River, and Fairbanks, on Tanana River, have developed as supply points for the mining regions in their vicinity. The town of Rampart, with a population of about 200, is on the south bank of the Yukon, 170 miles below Circle and about 70 miles above the junction with the Tanana, at a point where the Yukon, after pursuing for a few miles a southerly course, bends squarely to the west and sweeps in a deep channel past the hills which bound the south side of the rather open valley. A narrow-terraced slope between these hills and the river is picturesquely occupied along the water front and hillside in the background by the irregular collection of buildings which forms the town. There is an air of importance about the place, and it possesses, also, a kind of dignity which the pervasive majesty of the great river and the vast loneliness of the country through which it flows have conferred upon every one of these small isolated outposts of civilization.

Supplies are received from the outside world by way of either St. Michael or Dawson. By the first course they are shipped by water to St. Michael and carried thence by river steamers up the Yukon, a distance of about 900 miles, to Rampart. By the second course they are shipped from Skagway by the White Pass and Yukon railroad through Canadian territory to White Horse, by river steamer to Dawson, and by the lower river boats, a distance of 500 miles farther, to Rampart. The fact that in the spring navigation opens first on the upper Yukon has led to a preference of the Dawson route when it is desired to have supplies arrive at their destination early in the season. The first-class passenger rate during the summer of 1904 from Seattle to Rampart by way of St. Michael was $127.50; that by way of Dawson was $111. The freight rates have a wide range of variation, according to the kind of material and the time of year. The approximate rates on ordinary supplies by way of St. Michael and Dawson respectively during 1904 were $57 and $106 a ton.

The gold-producing creeks are at distances of 5 to 30 miles from Rampart, and are connected with the town by trails. Minook Creek enters the Yukon from the south about a half mile above Rampart. The main trail follows its valley a distance of about 20 miles to the head, and then passes over the divide at an elevation of about 2,000 feet, and extends to the creeks in the southern part of the region. Side trails leave the main trail at intervals for the various creeks. Supplies are transported over these trails by pack train in the summer and by dog or horse sleds in the winter. The summer rates are 4 to 15 cents a pound, according to distance, and the winter rates to the same localities are 2 to 6 cents a pound. Summer traveling is bad. The trodden muck along the valley sides and bottoms favors the accumulation of water, and the interlacing ditch-like trails entail much hardship upon the pack animals, which flounder along them, and increase the cost of gold production to the miners, none of whom are in a position to improve them. Most of the freighting is consequently done in the winter time. Several outfits at Rampart are in the freighting business, and in both summer and winter make trips at regular intervals to the creeks.

There is a station of the Government telegraph line at Rampart which affords communication by way of the Tanana with other portions of Alaska and the outside at rates which are low in comparison with the advantages which may thus be secured. The mail facilities are improving from year to year and, as the rates on small quantities of light material compare very favorably with the freight rates, this method of obtaining such supplies from the States during the summer season is often utilized and is of considerable benefit to the people.

The four important gold-producing regions of the Yukon-Tanana country have been visited at various times by parties from the Geological Survey, which have been engaged either in mapping these regions and the little-known areas between them, or in studying the gold-bearing deposits and the distribution of the formations which occur in the gold-producing regions. The results have been embodied in

maps and reports, some of which have already been published by the Survey, while others are in preparation.

The Fortymile, Birch Creek, and Rampart regions were visited by a survey party consisting of Spurr, Goodrich, and Schrader in 1896, and the results are to be found in the report of that expedition.[a]

In 1902 Collier, in the course of an investigation of the coal resources along the Yukon, studied the gold placers in the southern portion of the region.[b] Late in the fall of the same year Brooks, near the close of his reconnaissance about Mount McKinley, traversed a portion of the Rampart region.[c]

The work of all these expeditions has resulted in an accumulation of material, partly topographic and partly geologic, which becomes increasingly valuable to the people of the region in tracing the occurrence and distribution of the gold-bearing deposits.

During the season of 1904 the writer, under instructions from Mr. Alfred H. Brooks, geologist in charge, assisted by Frank L. Hess, with a packer, cook, and 7 horses, made a geologic reconnaissance overland from Eagle by way of Fairbanks to Rampart, and it was in the course of this trip that the observations were made and the material was collected which form the basis of this description.

After concluding work in the Fairbanks region the party started overland from Cleary Creek for Rampart on the 5th of August, and on the 26th reached a tributary of Troublesome Creek, in the Rampart region, at a point where the Brooks party had camped two years before. There in 1904 the smoke of a camp fire indicated a zone of prospecting. The remainder of August and the first part of September were spent among the gold placers. On the 20th of September the party started by steamer up the Yukon, and reached Seattle on the 5th of October, only fifteen days from the time of leaving Rampart.

The route chosen by the party lay northwest from Cleary Creek across the White Mountains and the ridges beyond to the southern limit of Yukon Flats, thence southwest to the main divide between the Yukon and Tanana drainage systems, thence west along this divide to the rough hills which mark so conspicuously the location of the Rampart region.

The conditions of travel by pack train in the Yukon-Tanana country are comparable with those prevailing in portions of the States and deserve no special mention. The horses are all used as pack animals and carry generally not more than 175 pounds. The divides are preferred for travel, as they are mostly free from timber and generally afford a firmer footing than the valleys. Some of the lower divides, however, are thickly covered with small spruce, and in a large area east of the Rampart region the moss and grass of the divides form a niggerheaded surface which retards the progress of the pack train. The streams within the hill country occasionally offer better conditions for travel than the divides. They can be crossed and recrossed at will and their gravel-covered bars can be followed sometimes for miles. At times of high water, however, they may impede travel. Grass grows luxuriantly in some of the sunward-facing draws and in portions of the larger valleys, and is generally in good condition from the latter part of June to at least the first of September. Although the horses sometimes have difficulty in obtaining sufficient food, and are sometimes so tormented by mosquitoes as to be unable to eat quietly where there is abundance, they generally end the season in fairly good condition.

The members of the party always received active help from all those among whom their labors were performed, and pleasantly remember many kindly acts of

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[a] Spurr, J. E., Geology of the Yukon gold district, Alaska: Eighteenth Ann. Rept. U. S. Geol. Survey, pt. 3, 1898, pp. 87–392.

[b] Collier, A. J., The Glenn Creek gold-mining district, Alaska: Bull. U. S. Geol. Survey No. 213, 1903, pp. 49–56. Coal resources of the Yukon, Alaska: Bull. U. S. Geol. Survey No. 218, 1903, pp. 41–43.

[c] Brooks, A. H., Exploration in the Mount McKinley region, Alaska: Prof. Paper U. S. Geol. Survey No. —. (In preparation.)

hospitality. Alaska is a land of strong contrasts, and when, in the gloom of a rainy night, amid the dripping brush and running waters of a sodden valley, the cheerful light of a miner's cabin draws the traveler to unaccustomed warmth and dryness, the heartiness of the welcome illustrates most forcibly the hospitable spirit of the people in the midst of the ofttimes stern inclemency of the outer world.

This bulletin is intended to supplement the results of recent work in the Fortymile, Birch Creek, and Fairbanks regions[a] by a similar description of present conditions in the Rampart region and to include also a general description of the areas to the east, where the rocks of the Rampart region have their eastward extension. The writer has had the able assistance of Mr. Hess throughout the field and office work, and the results of the efforts of both in the field have been divided in the office for the sake of greater economy of time in the preparation of this report. Mr. Hess has described the gold placers, while the account of the general economic conditions, the geography and geology, and the supervision of the whole, have devolved upon the writer. His statement of the geology, which is merely preliminary, will be more fully developed in a description of the geology of the entire Yukon-Tanana country which is in preparation.

GEOGRAPHY.

GENERAL DESCRIPTION.

There is a large area north and west of the Fairbanks region which is limited on the north and south by the converging courses of Yukon and Tanana rivers, respectively, and is terminated on the west by their confluence. It is shown upon the accompanying geologic map (Pl. I), which indicates the main drainage lines and the route of the party from Chatanika River northward to the southern limit of Yukon Flats and thence southwest to the creeks of the Rampart region. This map, while only approximately correct, in so far as it is based upon the work of the party in which distances were estimated by pacing, directions by pocket compass, and altitudes by aneroid barometer, represents with fair accuracy the general relations of the narrow belt of country traversed to the larger area of which it forms a part.

The surface of this area presents the same kind of features as those to the east, but there is considerable difference in their development, due partly to the narrowing space between the two rivers and partly to difference in the bed rock. There is the ridge and valley feature which occupies the greater part of the area and the flanking lowlands, on the north the Yukon Flats, and on the south the flat area drained by tributaries of the Tanana.

The ridges show a general uniformity in height of 2,000 to 2,500 feet, but some rise conspicuously above their surroundings to an altitude of nearly 5,000 feet and others become broader and lower and merge into the valleys on each side.

The divide between the drainage systems of Yukon and Tanana rivers throughout the Yukon-Tanana country has an extremely irregular course, due to the extensive ramifications of many streams among ridges of nearly equal height, and in this western part of the country in addition to the irregularity of direction there is a great variation in altitude. It is in places a prominent sharply defined ridge, while in other localities it becomes a low flat, separating with broad indefiniteness the waters which linger on its surface.

The features of greatest prominence are the White Mountains, extending northeast and southwest through the eastern part of the area, and the high group of hills 50 miles west of the White Mountains, in the vicinity of Rampart. The country between these two main features comprises many ridges, which toward the north are in general higher and break off with abruptness to Yukon Flats. The southern

[a] Prindle, L. M., Gold placers of the Fortymile, Birch Creek, and Fairbanks regions, Alaska: Bull. U. S. Geol. Survey No. 251, 1905.

limit of the hill country is less abrupt and the ridges merge gradually into the lowlands of the Tolovana.

The valleys, too, exhibit as much variation as the ridges. There are deep, steep-walled canyons which lead away their waters quickly, and there are open spaces where the waterways are only slight depressions in a rolling surface having an almost imperceptible grade. The streams throughout this country often pursue most irregular courses before they finally extricate themselves from the many ridges and become identified with their respective drainage systems. The important tributaries of the Yukon are Beaver Creek, Hess Creek, and Minook Creek; those tributary to the Tanana are Tolovana River and Baker Creek.

The hill country gives place along an east-and-west line which crosses the Yukon a short distance above Fort Hamlin to one of the most striking features in the interior of Alaska—Yukon Flats. From the base of the overlooking ridges, 1,500 to 2,000 feet above them, they extend northward toward the plateau country fronting the Rocky Mountains and eastward far out beyond the sky line. The sparsely timbered surface is somewhat uneven and broken where minor ridges run out into it from the base of the hills. It is dotted with a few small lakes, and the minor streams which furrow deeply the northern slopes of the hills run irregularly across it in no well-defined valleys of their own. Through it all can be seen long lines and crescent-shaped areas of water where the many interlacing channels of the Yukon spread widely over the great surface. The lowlands along the southern border of the hill country, the Tolovana and Baker flats, although occupying large areas, are local features less sharply differentiated from the hills and more closely related to their respective drainage systems.

RELIEF.

The distance in a straight line from a point on Chatanika River about opposite the mouth of Cleary Creek to Yukon Flats is about 60 miles, and the section may be roughly divided into three parts—the country from Chatanika River to Beaver Creek, the White Mountains in the space between the two parts of Beaver Creek, and the ridge country between the northern part of Beaver Creek and Yukon Flats.

A space 20 miles wide between Chatanika River and Beaver Creek is occupied by the broad ridge which separates the tributaries of the two streams. This ridge extends in a northeast and southwest direction and has an elevation of about 1,000 feet above the valleys on each side. It is very unsymmetrical. The southeast slope is rather steep and is worn by short tributaries of the Chatanika into minor lateral spurs, which descend abruptly to the valley. The northwest slope presents a striking and unexpected contrast. Long, broad, lateral ridges extend their dark, spruce-clad, undulating surfaces with gradually diminished height toward the steep-sided serrate ridges of the White Mountains and finally 15 miles away merge into the open valley of Beaver Creek. These ridges, so uniform in height and even in outline, are separated by wide, shallow, sparsely timbered valleys of equal uniformity, occupied by small, weak streams which flow with gentle gradients for several miles to Beaver Creek.

The White Mountains (Pl. II, *A*, p. 10), as seen from the highest parts of this ridge, rise abruptly from the somber foreground which extends with apparent continuity to their base, and not till the explorer reaches the edge of Beaver Valley does he understand their true relation to it and to the country to the south. They extend in a northeast and southwest direction a distance of 50 or 60 miles and form perhaps the most persistent group of ridges in the Yukon-Tanana country. They rise 2,000 feet or more above the base and increase in height toward the northeast, where some of the highest points have an altitude of about 5,300 feet. To the southwest they narrow rapidly to a single, knife-edge ridge, which terminates at Beaver Creek about 35 miles nearly north from Fairbanks. The uneven ridges exhibit a great variety of

topographic detail. The edges of upturned limestone beds have been reduced by weathering to more or less disconnected, precipitous, shattered masses which rise in places to heights of several hundred feet above the general outline and impart to the range a peculiarity of form almost as striking as that of color. The rocky slopes are made less precipitous by the piles of débris into which they plunge, and these in turn run out into a gradually sloping more or less extensive base covered with the vegetation of the tundra and flattening until it merges with slight abruptness into the valley of Beaver Creek. The rocky slopes above are furrowed with steep rock-strewn gulches which are mostly dry. In the lower part these gulches become narrow valleys inconspicuously sunk in the surface and carrying ordinarily but little water.

Southwest of the White Mountains, across Beaver Valley, bare even-topped ridges, nearly uniform in height, form the background of the amphitheatral area around the bend of Beaver Creek and extend northward to become laterally adjacent on the west to the terminating ridge of the White Mountains. A few jagged points project inconspicuously from the level of these ridges and seem to indicate the continuation in this direction of the formations so accentuated to the northeast and to emphasize the loss of topographic individuality that has been sustained. A few miles west of the southern part of the mountains the country opens widely toward the southwest, where a broad low divide, with an altitude of approximately 1,500 feet, separates the Beaver waters from streams tributary to the Tanana.

Northwest of the White Mountains, between Beaver Creek and Yukon Flats, in a distance of about 20 miles, there are several nearly parallel ridges, the trend of which is at first northeast parallel with the White Mountains, but changes gradually as they are crossed from one to the other northward until the trend of the ridges near the Flats is approximately east and west. The ridges are of various heights, with an average of perhaps 2,500 feet, and have a somewhat uneven outline. Between the steep-sided prominent ridge which forms the northern limit of Beaver Valley and the equally prominent ridge which overlooks the Flats there is the divide which separates the headwaters and tributaries of three important streams—Beaver Creek, Hess Creek, and Tolovana River. This divide, in comparison with the ridges which start from it and gain in prominence down their respective drainage systems, is low and inconspicuous and shows an area of open country where long, bare, gradual slopes present the clean-cut appearance of meadows freshly mown (Pl. II, *B*). The drainage is marked by lines of green traced along the flatly intersecting bases of the slopes, vivid in color toward the sources of the streams where only willow patches grow and of a more somber shade lower down the valleys where scattering groups and lines of spruce are delicately outlined against the brownish background.

Northward the country rises gradually to the level of an even-topped east-west ridge 2,000 feet in height, surmounted by a few steep-sided domes of greater height, and then descends by intermediate flanking ridges with more or less abruptness to the Flats. The northern and southern slopes of this ridge are deeply cut by minor tributaries and toward the west it terminates finally as a spur between Hess Creek and one of its northern tributaries. The flanking ridges on the north replace it and, with approximately the same altitude, continue westward toward the Yukon at Fort Hamlin.

The main divide between the Yukon and Tanana drainage systems is about 25 miles south of the Yukon and extends in a nearly westerly direction toward the hills of Rampart. There are no topographic features of special interest. The divide is in places a well-defined ridge sharply differentiated from its surroundings; at other localities it is less conspicuous than the numerous long lateral spurs which descend irregularly from it toward the valleys of Hess Creek and Tolovana River, and at one locality, as far as could be observed, the headwater streams from the north and south

A. VIEW NORTHEASTWARD ALONG THE RIDGES OF THE WHITE MOUNTAINS.

B. VIEW SOUTHEASTWARD TOWARD THE HEAD OF GOLDEN CREEK.

seem to have so far reduced the space between them as to interlock in a rather extensive flat at an altitude of approximately 1,500 feet, where a few scattering lakes indicate the indefiniteness of the drainage.

From the White Mountains and from the commanding ridges of the Fairbanks region can be seen a group of hills 50 miles or more to the west, which rises abruptly from the indistinct level of its surroundings so that it forms the most conspicuous topographic feature in all the far western section of the Yukon-Tanana country. This group resolves itself on nearer view into the main divide between the Yukon and Tanana drainage systems and two prominent extensions from it to the north—Lynx Mountain, a ridge several miles in length, and Wolverine Mountain, a massive peak which gives to the Rampart region a maximum relief of over 4,000 feet with reference to the level of the Yukon at Rampart.

This portion of the divide contrasts strongly with that immediately to the east. It is higher, sharper, and rougher, extends in a northeast-southwest direction with a minimum altitude of about 2,000 feet, and separates with no indefiniteness the waters which flow to the north and to the south toward Yukon and Tanana rivers. Long, rough, lateral spurs extend northward toward the Yukon, and their steep sides are deeply cut until there is presented a repetition of sharp spurs separated by deep narrow canyons, which has justified the name "Troublesome country," commonly applied to a part of this region. South of the divide there is less complexity. Long, more gradually sloping ridges separate the more open valleys and merge finally into the extensive flats of Tolovana and Baker valleys. This difference in topographic expression so frequently observable on the northern and southern sides of the Yukon-Tanana country is here in the narrower space between the two rivers brought thus into sharper contrast.

The name Lynx Mountain has been applied to the southern end of a ridge about 30 miles southeast of Rampart, which extends northward from the main divide a distance of about 5 miles, has an altitude of approximately 4,000 feet, and is topographically distinct from its surroundings. The outline is irregular, developing in places into rugged, angular points. The upper slopes are steep and have furnished much material for the extensive accumulations of talus below. Along the greater part of the eastern base they plunge deeply into narrow canyons. Toward the southern end of the eastern base, however, the undulating surface of the main divide roughens in proximity to the ridge, and throws a wave-like prominence high up along the slope, the brown moss-covered surface of which contrasts strongly with the rock-strewn slopes above. Off to the east is the even surface of the broad divide. The southern termination of the ridge and a part of the western base are flanked by a slightly concave graded slope, the even surface of which is marked by ripples of fine rock waste. As the main divide extends round the southern end of the ridge the drainage is mostly toward the Yukon, and numerous tributaries of Hess Creek drain northward from both sides.

Wolverine Mountain is the crowning point of a bulky mass in the main divide, 8 miles west of Lynx Mountain and about 12 miles southeast of Rampart. It has an altitude of approximately 4,640 feet and towers several hundred feet above adjacent parts of the ridge. The western slopes descend with steep but more or less regular grades to valleys which carry the drainage toward the Tanana. The northern slopes are steeper. Sharp spurs with a concave outline plunge in divergent courses toward the valley 2,000 feet below and divide into minor steeper spurs which buttress the mountain side. The spurs become more rounded and more divided toward the base and extend thence northward with more gradual slopes about 1 mile to the main drainage line. The edges of the upper spurs are shattered into piles of fragments, and the débris-laden slopes of neighboring spurs steeply intersect to form the gulches which furrow conspicuously the northern face.

DRAINAGE.

The drainage systems are represented on the accompanying map in various stages of incompleteness, but with sufficient detail to show their general relations. Tolovana River, tributary to the Tanana, with its long and widely divergent branches, occupies the central and largest part of the field. On the east Beaver Creek in flowing to the Yukon follows a peculiar V-shaped course between tributaries of the Tolovana. On the north and west are Hess and Minook creeks flowing west and north respectively at right angles to each other to the Yukon, while in the southwest the short irregularly fan-shaped system of Baker Creek carries to the Tanana the drainage from the southern slopes of the main divide.

Tolovana River has several far-reaching tributaries which approach closely the Birch Creek and Fairbanks regions on the east and the Rampart region on the west. On the north they drain a large area between the systems of Hess and Beaver creeks. Chatanika River, which is the most important tributary from the east, has its sources far to the northeast opposite the headwaters of Birch Creek. It enters the southeastern portion of the area and is closely identified with the Fairbanks region since Cleary Creek, an important gold producer, is a tributary. The stream is comparatively straight and flows southwest toward the Tolovana. About 50 miles below the source, near the mouth of Cleary Creek, it is comparable in size with Little Chena near the mouth of Fish Creek, having a width of 100 to 200 feet, and at ordinary stages of the water it is easily fordable on foot. The valley is open and of low grade and the stream keeps mostly to the steep northwestern side. On the southeast long lateral spurs from the distant ridges merge gradually into the flat valley. The tributaries are small and short. The valleys of those from the northwest are narrowly V-shaped; those from the southeast are more open and their stream flats grade gently into that of the Chatanika. Sixty miles to the west another tributary of the Tolovana, Goose Creek, receives the drainage from the deeply furrowed slopes south of Lynx Mountain and flows in a northeasterly direction until it almost breaks in upon the tributaries of Hess Creek, when it bends gradually to the south and southwest to form an important tributary of the main stream. There are several streams between Beaver and Hess creeks, which flow in narrow V-shaped valleys southwestward toward the Tolovana. These probably unite to form tributaries of considerable size before reaching the lower valley.

The valleys of all the tributaries coalesce finally into a flat which forms a great embayment extending northeastward from the river's mouth far into the hill country toward the Yukon. The surface of this flat is partly covered with large areas of grass and is flecked with lakes, some of which are of considerable size. Patches of timber run out into it from the lower slopes of the ridges and dark lines of timber crossing it indicate the drainage lines, where streams flow inconspicuously with a deep, sluggish current in channels lying 20 feet or more below the even surface.

Beaver Creek has a peculiar relation to the drainage system of the Tolovana. It flows with the tributaries of the latter as if it were one of them and then turns northward from among them to the Yukon. It heads far to the northeast opposite the headwaters of Preacher Creek, flows southwest close along the eastern base of the White Mountains in the same direction as the Chatanika, but about 15 miles farther to the west, turns sharply round the southern termination of the mountains, flows northeast along their western base nearly parallel with its former course to Yukon Flats, and crosses this great lowland in a circuitous course north and west to the Yukon. The length of the southwestward flowing portion is probably at least 30 miles; that of the northeastward flowing portion is much greater. The distance from the mouth of the creek along the many wanderings across the Flats to the point where it emerges from the hills is reported to be nearly 200 miles. Where crossed by the Survey party at two localities east and west of the White Mountains the creek

is comparable in size with Chena River a few miles above the point where it is joined by West Fork. The stream has a width of 200 to 300 feet or more at ordinary stages of the water and is easily fordable on foot. The volume of water is at times large enough to permit prospectors to travel downstream in rafts from a point about 5 miles above the sharp bend round the White Mountains, but on account of the shallowness of the water at the riffles considerable difficulty is probably experienced in this method of navigation. The creek meanders in a low-grade open valley. Above the bend the stream keeps close to the eastern base of the White Mountains and the valley is mostly on the eastern side where it extends back flatly nearly 2 miles to the base of the gradually sloping ridges. After rounding the southern termination of the White Mountains, however, the valley contracts to a width of about one-fourth of a mile, and flows for about 4 miles between the narrow ridge of the White Mountains and the ridge of the same height which extends northward from the plateau-like country to the southwest. Rounding the northern termination of this latter ridge the stream turns to the left in a northerly course and then to the northeast again to flow in wide meanders through a beautiful flat valley that is limited on the east by the broad slopes of the White Mountains and on the west by a steep ridge, which becomes more broken and more prominent toward the northeast, in harmony with the increasingly imposing character of the stream, which flows closely along its eastern base.

Most of the tributaries of Beaver Creek in the portion of the valley traversed by the Survey party are small. Two tributaries drain the southern part of the White Mountains, and one of these has been called, for purposes of description, Fossil Creek, from the occurrence of fossiliferous limestone pebbles in its valley. The single narrow limestone ridge which terminates the White Mountains is accompanied farther east by a parallel ridge of shorter southern extent. The view from this ridge shows between the two a low-grade valley 2 miles wide, extending northeastward a distance of nearly 10 miles, drained by a stream which flows along the western side close to the base of the limestone ridge. From the base of the ridge on the east broad flat spurs separated by open depressions so shallow as hardly to be noticeable extend westward to the stream. On close examination the apparently continuous valley is seen to be composed of two parts—a lower, drained by a stream which seems disproportionately small for the size of the valley, and which has its rise in a few small stagnant ponds strung longitudinally along its course about 5 miles from Beaver Creek, and an upper, drained by a stream of about the same length, which runs at first southwestward, in line with the stream of the lower portion of the valley, and then turns abruptly westward to flow to Beaver Creek through a narrow canyon which interrupts inconspicuously the continuity of the limestone ridge.

This upper part of the valley has been reduced somewhat below the level of the lower part, but not to an extent appreciable in a general view of the valley. The case is one of stream diversion where a minor tributary of the Beaver has cut through the limestone ridge and diverted to itself the waters of the upper portion of a valley which used to drain southwestward along the eastern base of the limestone ridge all the way to Beaver Creek. The diversion of the drainage from the upper valley has weakened the stream which occupies the lower portion of the valley, and its forceless character is indicated by the string of small ponds along its present headwaters.

The tributaries of Beaver Creek from the east and south enter through open flat valleys. The valleys of tributaries from the west become more canyon-like toward the northeast, and there are none of importance until Victoria Creek is reached. This creek is reported to be 50 miles or more in length and to flow in its lower part in a comparatively narrow canyon. The branching headwaters are small streams, colored brown by vegetation, which flow in valleys, whose wide sweeping slopes are

mostly bare of timber. On this creek, close to its junction with Beaver Creek, near the southern limit of Yukon Flats, some prospecting was being done in the fall of 1904.

Hess Creek is about 60 miles long, flows in a general westerly direction, and enters the Yukon about 25 miles above Rampart. Its headwaters are closely associated with those of Beaver Creek and the Tolovana. Its northern tributaries penetrate far into the narrow belt of ridges between it and Yukon Flats. The southern tributaries head far back in the main divide opposite those of the Tolovana, and in places are most closely associated with those of the latter stream; westward near the Rampart region they interlock with the tributaries of Minook Creek. This stream, where crossed by the Survey party in 1904, was nearly the size of the Chatanika and was easily fordable on foot. It flows meanderingly in a fairly flat valley with a maximum width of perhaps 2 miles. The main valley is limited on the north generally by rather steep slopes. The southern side of the valley has apparently more tributaries and has been much dissected by them into numerous long ridges which extend in most irregular courses northward from the main divide. The valleys of these southern tributaries in the area between the headwaters and Lynx Mountain are often open and form large, ill-drained spaces where lakes are common.

The most important tributary in the vicinity of Rampart is Troublesome Creek. It heads in the main divide opposite the headwaters of the Tolovana and flows in a general northerly direction a distance of 30 miles or more to Hess Creek. The valley is of the canyon type, with a narrow flat at the bottom, over which the stream flows in a meandering course. This stream is probably comparable in size with Minook Creek. Our knowledge of it is confined mostly to the upper portion of the valley, where it is formed by minor tributaries from the east and west, which drain the slopes of Lynx and Wolverine mountains and the portion of the divide between these prominent points. They are deeply incised within the inclosing ridges and their minutest ramifications are to be found in the steep, narrowly V-shaped gulches which furrow the northern slopes of the divide and the flanks of the two imposing prominences. The heads of the minor valleys are in some cases open park-like spaces of small extent, which contrast strongly with the inclosing rock-strewn slopes.

The two most important tributaries in this upper part of the valley are Gazzam or Quartz Creek from the east and Quail Creek from the west. The first is a small creek which heads in the main divide near the southwest base of Lynx Mountain and flows at first northwest and then west a distance of about 5 miles to Troublesome Creek. The upper portion of the valley is open and is formed on the east by the beautiful slope at the base of Lynx Mountain; the western side of the valley is steep and a few small tributaries are received from V-shaped canyons. The valley narrows about 2 miles below the head to a steep-walled canyon deep within the ridges of either side. Quail Creek is the most important tributary of the upper valley. It is formed by two forks from the south and west, which join about a mile west of the Troublesome. The southern fork receives the drainage from the divide and the eastern flanks of Wolverine Mountain. The western fork heads opposite Hoosier Creek and flows in an easterly direction a distance of about 5 miles to the junction of the forks. The eastern part of the valley has a gradual northern slope, while the southern side is comparatively abrupt. Toward the headwaters the valley is more symmetrical. There are many small tributaries from the northern slopes of Wolverine Mountain, and most of these enter through narrow valleys. As on Hess Creek, benches are developed in places along the sides of the valley at a height of 400 feet or more above it.

Minook Creek, tributary to the Yukon, is the most western of the important streams in the Yukon-Tanana country and shares with Baker Creek, tributary to the Tanana, the prominence resulting from the occurrence of gold in the drainage areas of these two streams. Minook Creek, which lies about 12 miles west of Troublesome

Creek, heads at a point about 25 miles south of Rampart and flows in a northerly course through a narrow valley. West of the valley a steep slope rises to a height of 1,000 feet or more above the stream. The eastern side of the upper portion of the valley is formed by a similar slope. In the lower part of the valley, however, the eastern slope is formed by the abrupt streamward-facing slope of a flattened area which, where it breaks off to the stream, has an elevation of about 500 feet above it and slopes gradually upward toward the base of the hills and widens to the north until it attains a maximum width of about 3 miles. The significance of this flattened area or high bench, as it is called by the miners, with reference to Minook Creek, will be considered elsewhere in this report. It suffices here to say that it is one of the products of valley development in the region, and that its relation to Minook Creek is similar to that of the small, low benches which occur in the valley of the present stream, being really a portion of an older valley in which the present canyon has been cut. The most important tributaries from the east are Hunter, Little Minook, Little Minook Junior, Hoosier, Florida, and Chapman creeks. The most important from the west are Ruby, Slate, and Granite creeks.

Minook drainage in general may be described as a system deeply sunk within the inclosing ridges, draining with the ramifying headwaters of the eastern tributaries the rough country in the vicinity of Wolverine Mountain, to the south interlacing closely with the headwaters of Baker Creek and to the west draining a narrow strip of country extending backward only a few miles from the main valley.

The Baker Creek system is of a different character. Baker Creek is formed by the union of tributaries which converge from an irregularly fan-shaped area extending to a distance of about 20 miles north of Tanana. The main stream flows for the greater part of its course in a southeasterly direction close to a low ridge which limits the valley on the south and then turns abruptly through the ridge to flow for the rest of its course southwest toward the Tanana. The flat valley, known as Baker Flats, extends northward 6 miles or more to the southern limit of the hill country and forms a feature similar in character to Tolovana Flats.

The tributaries are mostly from the north, and the most important of these northern tributaries or their branches are the Hutlina, Pioneer, Eureka, Glenn, Rhode Island, Omega, and Thanksgiving creeks. They rise to the east opposite the headwaters of the Tolovana, farther west receive the drainage from the southern slopes of Wolverine Mountain, and still farther to the west drain the southern slopes of the main divide opposite the headwaters of Minook Creek. They flow in southwesterly courses and beyond the edge of the hills partly unite and partly find their way by indefinite courses to Baker Creek. They exhibit at first the characteristics of the streams of the northern slope, flowing deep below the inclosing ridges in narrow steep-walled canyons. The valleys widen rapidly, however, and their lower open parts merge with gentle gradients into Baker Flats while the long even-topped ridges between them descend somewhat more abruptly to the same level.

A most striking detail of form development which finds constant repetition is the unsymmetrical cross section of the valleys. The southeast side descends steeply a distance of several hundred feet to the stream, while the northwest side rises gradually for a distance of a half mile or more back from the stream and then ascends somewhat more steeply to the ridge line and descends abruptly to the neighboring parallel stream. Benching has been associated with this unsymmetrical development of the valleys, and the gradual northwestern slopes have afforded conditions favorable for the retention of gold-bearing gravels at elevations of 200 to 300 feet and more above the present level of the streams.

The main features of the Baker system are the long, even-topped ridges extending southward from the main divide, inclosing the unsymmetrical valleys, the gradually sloping benches of the lower valleys, and, beyond the terminations of the ridges and the benched areas of the lower slopes, Baker Flats.

VEGETATION.

The high ridges are mostly bare of trees and covered only with the brownish vegetation of the tundra. The lower ridges are often covered with a dense growth of scattering spruce. The timber, however, is confined generally to the main valleys, where it is most thickly concentrated in scattering bunches along the water courses. Spruce is the most important tree and frequently attains a diameter of two or more feet. Birch and poplar are associated with it, and in the larger valleys there is a small proportion of tamarack. Willows and alders grow abundantly near the streams. There is said to be good timber in the lower valley of the Chatanika, and some good timber is known to occur in Tolovana Valley. Beaver Valley, where crossed by the Survey party, contained but a small amount of timber suitable for mining purposes, and the part of the valley observable from the surrounding hills showed but small areas of timber. The low ridges forming the eastern side of Beaver Valley east of the White Mountains present in places the appearance of a well-timbered country, but are in reality covered only with a thick growth of small spruce. The upper valley of Hess Creek and the open valleys of its tributaries contain also abundant small spruce with some larger timber near the streams. The valley of Minook has contained considerable timber of sufficient size for mining purposes, but there is only a small amount of such timber left. The valleys of the southern slope facing Baker Flats contain but little timber of large size, and thus far the resources of Hutlina and Baker valleys, where there is said to be some good timber, have been but little utilized. The main supply for the Rampart region must come from Yukon Valley or be imported, and lumber in 1904 was worth as high as $100 a thousand. Timber for fuel purposes is abundant in most of the valleys and on the lower slopes.

Feed for horses can generally be found on the sunward-facing slopes of the main valleys, where there is often a luxuriant growth of grass among the birches. Grass grows abundantly on portions of the high bench near Rampart, and there are large grass-covered areas in Tolovana Flats. Vegetables can be grown easily, and at Hot Springs, a locality near the Tanana, they are raised in large quantities and sold to the miners. The Government has an experimental farm on the north side of the Yukon opposite Rampart. Blueberries and cranberries are almost always to be found in abundance, and at one locality in the Rampart region currants and red raspberries were being preserved for winter consumption.

GEOLOGY.

GENERAL FEATURES.

The bed rock in the western part of the Yukon-Tanana country, while including some small areas of metamorphic schists, is made up mostly of sedimentary rocks, less metamorphosed than the schists lying to the east. The prevailing color is black from the large amount of carbonaceous matter present in the slates, but associated white limestones often become prominent and in the White Mountains through their color and topographic development emphasize the lithologic change from the quartzite-schists, quartz-mica-schists, and gneisses of the Fortymile, Birch Creek, and Fairbanks regions to the younger-looking rocks of the western areas. A considerable variety of igneous rocks occur in the vicinity of Rampart, and greenstones are common throughout the area. The general strike of the rocks is northeast and southwest. They have everywhere been closely folded and the folding seems to have been most intense in the Rampart region, where there has been further deformation of the rocks, resulting in some cases in brecciation.

STRATIGRAPHIC SUCCESSION.

The variety of the rocks and the close folding which they have undergone have rendered difficult the attainment of definite knowledge regarding their sequence, thickness, and contact relations. Their areal distribution, so far as observed in the narrow belt of the country traversed, is shown on the accompanying geologic map (Pl. I), and the provisional order of stratigraphic succession is outlined in the following tabular statement:

Provisional tabular statement of stratigraphy.

Age.	Formation name.	Contact relation.	Lithologic character.
Quaternary	Recent		Stream gravels.
	Pleistocene		Bench gravels.
Tertiary	Kenai	Unconformity to Paleozoics.	Conglomerates, sandstones, and consolidated clays.
Cretaceous?			Black carbonaceous sandstones and slates.
Pennsylvanian or Permo-Carboniferous.			Gray, greenish, and black shales with thin siliceous beds.
Devonian	Rampart and possibly other formations.		Gray and blue, partly siliceous limestones, greenstones, quartzites, and slates.
			Conglomerates and fine fragmentals, slates, and interbedded limestones.
			Cherts, slates, and greenstones.
Pre-Devonian	(Fortymile and Birch Creek.)	Unconformity	Crystalline limestones.
			Quartz-mica and garnetiferous schists.
			Quartzite schists.

The oldest rocks are believed to be the schists, predominantly quartzite-schists, which occur southeast of the White Mountains in the ridge which forms the western limit of Chatanika Valley, and the garnetiferous quartz-mica-schists with associated highly crystalline limestones which occupy a small area in the Rampart region along Minook Creek in the vicinity of Ruby Creek. Their age is unknown, and they are referred in this report to the pre-Devonian. The rocks from the White Mountains westward, inclusive of the Rampart region, are mostly of Paleozoic age, and the evidence of the few fossils collected indicates the presence of both Devonian and Carboniferous rocks. There is a possibility that some of them are Silurian, but in the absence of positive criteria for their further separation only two divisions have been made. Those regarded as Devonian include a variety of rocks differing greatly in lithologic character and occurring throughout most of the area. Cherts, slates with interbedded coarser fragmentals, greenstones, limestones, and quartzites are the most characteristic types. Along the northern edge of the hill country and at one locality south of Hess Creek fossils determined as Carboniferous were obtained, but the extent and contact relations of the Carboniferous rocks have not yet been determined. The rocks provisionally classed as Cretaceous are of doubtful age. They occur on Wolverine and Lynx mountains. On Wolverine Mountain fragmentary fossils were found which indicate an age not older than the Lower Cretaceous. The Kenai rocks occur along the Yukon and to a short distance up the valley of the Minook. High gravels, regarded as Pleistocene, are found locally along the larger streams to heights of 400 to 500 feet above them. The present valleys are occupied by stream gravels covered generally with muck and moss, and the thickness of the entire deposit, so far as developed on the gold-producing creeks, rarely exceeds 20 feet, but exceptionally is of much greater depth.

SEDIMENTARY AND METAMORPHOSED FORMATIONS.

PRE-DEVONIAN.

The most characteristic rocks in the eastern portion of the Yukon-Tanana country are gneisses, quartzite-schists, quartz-mica-schists, garnetiferous and hornblende schists, and crystalline limestone. In the Fortymile region the last three types predominate and have been called [a] by Spurr collectively the Fortymile formation; in the Birch Creek region and in the recently developed Fairbanks region the quartzite-schists and mica-schists, with occasional thin interbedded highly crystalline limestones, constitute the most common rocks and have been called by the same author the Birch Creek formation. They are considered by him older than the Fortymile schists. The age is not known, and for the purposes of this report they are both referred to the pre-Devonian.

The western limit of the large areas of these highly metamorphosed schists is in the ridge limiting on the northwest the valley of Chatanika River. The ridge is formed of the typical schists with some schistose limestone and graphitic schists, and like the rocks in the Fairbanks region the dip is generally low, a common attitude and one indicating not necessarily simplicity of structure but oftentimes a folding so extreme that the rocks have been folded upon themselves until the dips are often nearly horizontal. The first indication of a change in lithologic character was found in the occurrence a few miles nearer the White Mountains of a feldspathic schist, and then about 3 miles farther to the northwest overlooking Beaver Valley outcrops of a rather coarse-grained, greenish, impure, feldspathic quartzite showing no schistosity and dipping steeply to the west. The northwestern limit of the old schists is apparently somewhere in the intervening densely spruce-clad areas.

No more schists were observed until reaching the Rampart region, where on Minook Creek a small area of garnetiferous quartz-mica-schist with associated marbles occurs. This is apparently best developed on Ruby Creek, where the garnets of the schist accumulate rapidly in the sluice boxes. This formation of schist and limestone crosses the Minook at Hopkins Bridge with a northeast strike and a low dip to the southeast. Eagle Rock, about 1 mile below the bridge, is a bluff, 100 feet or more in height, composed of highly crystalline, banded limestone. There are minor folds and a general low dip to the north. Although the area is small and the marbles resemble somewhat other crystalline limestones in the vicinity they are so much more highly metamorphosed than any of the other rocks and are so closely associated with garnetiferous schists which are not known to occur elsewhere in the region that both the limestone and the schists stand in contrast to the adjacent rocks. The contact relations were not observed, but these rocks are believed to be unconformable with and older than the adjacent rocks to the north and south. Their resemblance to some of the schists and marbles of the Fortymile region is a striking one. They apparently strike off northeast under younger rocks.

No rocks were observed in the areas between these two occurrences of schist which suggest a correlation. Further investigation may reveal the horizontal equivalency of some of the highly metamorphosed schists with less metamorphosed rocks of known age, but all that it seems possible to do at present is to place them by themselves and call them pre-Devonian.

DEVONIAN.

Between the two areas of schists above described, the one the westward extension of the schists of the Fairbanks region, the other a small area the limits of which are not yet known, are the rocks most of which are regarded provisionally as Devonian. The bulk of the formation, as already mentioned, is made up of cherts, slates

[a] Spurr, J. E., and Goodrich, H. B., Geology of the Yukon gold district, Alaska: Eighteenth Ann. Rept. U. S. Geol. Survey, pt. 3, 1898, pp. 140–155.

with alternating beds of conglomerate, arkose, and quartzite, limestones, and largely tuffaceous greenstones. These rocks may be roughly divided into at least two groups according as cherts, slates, greenstones, and conglomeratic rocks, or massive limestones with greenstones, slates, and quartzites predominate. It is believed that those forming the first division are older and it may become advisable on more detailed work to make a separate formation of them. The term "Rampart series" has been used by Spurr[a] in grouping similar rocks occurring in other parts of the Yukon-Tanana country. In those areas, however, diabase, tuffs, and green slates are most abundantly developed, and carbonaceous slates and limestones, although frequently present, are of minor importance. In the areas under consideration, while the greenstones are found throughout, black slates, cherts, and massive dark- and light-gray limestones are more common and more strikingly characteristic of the formation. A section of these rocks is encountered in traveling from Chatanika River northward to the southern edge of Yukon Flats, a distance of about 60 miles, and this section, although incompletely studied, has afforded some material regarding the structure and age of the rocks which compose it.

The general strike in the southern part of the section is about N. 50° E. and it is instructive to note that the direction of structure which is so strongly emphasized topographically in the Alaska Range is here repeated. In the northern part of the section the strike is more nearly east and west. The rocks are closely folded and in most cases their attitude is nearly vertical. There is a distinct symmetrical arrangement with reference to a northeast-southwest axis, and, so far as our present knowledge extends, this symmetrical disposition of the rocks seems to be a fact of importance in regard to their structure and succession. This repetition is most noticeable in the occurrence of limestone. The White Mountain limestones with associated greenstones, flanked on the southeast by red and black slates and prominent masses of impure quartzite, find a repetition 15 miles to the north in another limestone belt less conspicuous topographically than that of the White Mountains, with a similar association of rocks and flanked also on the northwest by similar slates and quartzites. The rocks of the middle portion of the section are slates, greenstones, and cherts, and, although the relations are not clear, there are two main areas of cherts about 3 miles apart with black, purple, and greenish slates and some greenstones in the intervening space. In passing northward from the northern belt of cherts toward the northern belt of limestones there are conglomerates containing abundant chert pebbles. In passing southward toward the limestones of the White Mountains there are also chert conglomerates with pebbles an inch or more in diameter associated with finer rocks containing grains of chert and fragments of slate. Black slates are also common and thin beds of conglomerate are interbedded with them. The slates are closely succeeded by the limestones on either side and, although the direct relation of the two was not observed, it is believed that the limestones are younger than the rocks above described. The quartzite flanking the limestone on the north, which is very similar to other quartzites apparently interbedded with the limestones, contains occasional fragments of chert and it seems best for the purposes of this report and until further knowledge is available to consider the flanking slates and quartzites as partly of the same age as the limestones and partly younger.

Fossils found in the limestones of the White Mountains have been determined as characteristic of early to middle Devonian, and some of them are possibly of Silurian age; but the stratigraphic association makes it probable that all the remains belong approximately to the same horizon and the determinations point more definitely to the Devonian. No fossils were found in the limestones of the northern belt, but the rocks and their associations are very similar and no reasons were found for assigning them to a different position.

[a] Spurr, J. E., Eighteenth Ann. Rept. U. S. Geol. Survey, pt. 3, pp. 155–169.

If this interpretation of the section is correct the purple, green, and black slates and cherts with associated greenstones are probably the oldest rocks in the region and may possibly belong to the Silurian, but from the fact that wherever they have been found to occur they are intimately related to limestones, which, where determinable, have been found to be Devonian, it seems best at present to call them all Devonian.

The contact relations of these rocks with the rocks to the north and south of them are not clear. On the south the red and black slates with massive greenish quartzite form a ridge just west of Beaver Creek between Beaver Creek and the White Mountains, and outcrops of the quartzite occur sparingly southeast of Beaver Creek, where their attitude is nearly vertical. At the northern end of the section the relations are different. Fossils determined as Pennsylvanian or Permo-Carboniferous were found in a low, outlying ridge overlooking the Flats, and across a narrow valley on the south are black slates and cherts at the base of a high ridge, the topmost points of which are quartzites containing occasional chert pebbles interbedded with red and black slates and some dark limestones. All of these are regarded as Devonian.

The evidence at hand seems sufficient only to justify the statement that in the section from Chatanika River to Yukon Flats there is a large area of closely folded rocks, mostly of Devonian age, flanked on the south by highly metamorphosed schists and on the north by slates partly similar lithologically to the Devonian slates, but containing Carboniferous fossils. Any interpretation of the section on the basis of our present knowledge is open to objections. For example, dips were observed in the White Mountains which indicate a local anticlinal structure, but the folding has been so close that only more detailed studies of the structure supported by more than the fragmentary paleontologic evidence at our disposal will afford the basis for a reasonable approximation to the truth. The present hypothetical interpretation of the section is regarded as a temporary basis only, the first at hand, perhaps, for the preliminary description of the material occurring in this area. Whether it shall be found sufficiently strong to be given the dignity of a permanent basis in the explanation of the structure or must be replaced by one better able to bear the accumulating weight of evidence is, for the purposes of this report, immaterial.

Passing to the Rampart region there is found a variety of rocks like those already described. The disturbance which they have undergone has been greater and intrusion by igneous material more active. Folding has been intense, many of the rocks have been greatly sheared and in some cases brecciated by the forces to which they have been subjected. A section northward from Baker Flats to Rampart is shown in Pl. I. The strike of the rocks is nearly east and west. The garnetiferous mica-schists and marbles of Ruby Creek, considered as pre-Devonian, are followed on the north by cherts and greenstones and on the south by rocks including slate, chert, sheared chert conglomerate, fine-grained rocks having the same composition as the chert conglomerate and also sheared till they have been rendered schistose, massive quartzites, and siliceous limestones, in places much brecciated. Here, also, the succession seems to be from chert and slates through chert conglomerate to fine slate and limestones.

There are other localities in the Rampart region where a partial succession has been observed. The main divide to the east of Lynx Mountain is composed mostly of chert flanked by chert conglomerate, and at one locality near the southeastern base of Lynx Mountain there are fine exposures showing at the base a conglomerate containing sheared chert pebbles several inches in diameter, changing gradually to alternating beds of finer material. At a locality not far from this gray slates were observed highly folded and cleaved and pitching eastward. These slates contain thin beds of quartzite a few inches to a foot or more thick which contain grains of chert.

In Troublesome Valley the succession seems to be the same. A section southward

between Troublesome and Hunter creeks shows greenstones, cherts, sheared chert conglomerate, and slates, with disconnected limestone masses in which fossils determined as Devonian were found. The chert conglomerates are frequently found in close association with the limestones, and at the locality where Devonian corals were collected conglomerate with chert and quartz pebbles is found in close association with the limestone, which also contains quartz pebbles.

Most of the rocks encountered in the Rampart region are a continuation along the strike of those occurring in the section from the White Mountains nearly to Yukon Flats. There are the same lithologic types, the same associations, and, so far as the meager fossil evidence is available, it corroborates the relationship of the rocks in the two areas.

Following is the list of fossils collected by the party. The determinations were made by Mr. E. M. Kindle, of the United States Geological Survey:

Fossils from the White Mountains.

4 AP 240. This lot contains two corals, a *Michelina* and a *Zaphrentis*, neither of which is specifically determinable. Horizon probably Devonian.

4 AP 241. *Favosites* near *epidermatus* occurs in this collection indicating a horizon of Middle Devonian age.

4 AP 242. Specimens of a coral comparable with *Favosites winchelli* comprise the collection from this locality. Horizon probably middle Devonian.

4 AP 243, 245, and 246. These several lots represent the same horizon. The fauna as represented in the collection comprises a single species of brachiopod *Gypidula* of *pseudo-galeatus*. The horizon represented is either late Silurian or early Devonian, probably the latter.

4 AH 186. Includes only poorly preserved specimens of *Cladopora*. Probably of middle Devonian age.

4 AH 193. The fossils represented are *Cytherella* sp., *Cladopora* sp., and *Ptilodictya?* cf. *frondosa*. The horizon is probably Silurian.

4 AH 194. *Favosites* near *limitaris* occurs in this lot, indicating a horizon probably near middle Devonian.

4 AH 195. Contains an undetermined *Stromatopora*. Age probably Devonian.

Fossils from the Rampart region.

4 AP 303. Two poorly preserved specimens of *Aulacophyllum* comprise this lot. The horizon represented may be either Devonian or Silurian, so far as the evidence from this material indicates.

4 AP 317. Minute fragments of small corals in a breccia comprise this lot. Fossils too fragmentary for determination of the age.

CARBONIFEROUS.

At the extreme northern limit of the hill country, in a minor ridge bordering Yukon Flats, there are greenish, grayish, and black slates, with siliceous material, scattered fragments of which were found to contain fossils indicating a Pennsylvanian or Permo-Carboniferous age. At another locality, about 15 miles to the southwest, just south of Hess Creek, fossils also regarded as Carboniferous were found in soft black carbonaceous shales. At both localities the rocks are in close association on the south with cherts and slates, and it is possible that some of the cherts may be of Carboniferous age. All that can be affirmed at present is that in the northern part of the area there occur Carboniferous rocks, whose extent and relations to the rocks of Devonian age are not yet determined.

The following fossils, determined by Mr. George H. Girty, were collected at the two localities and the discussion of them is quoted from his report.

Fossils from near Yukon Flats and from Hess Creek, Alaska.

4 AH 213.

Stenopora, two sp.	Rhombopora sp.
Fenestella sp.	Productus ? sp.
Rhombopora sp.	Lima ? sp.

4 AP 270.

Fistulipora sp.	Rhombopora sp.
Stromatopora ? sp.	Rhombopora sp.
Coral sp.	Spirifer n. sp. ?
Fistulipora sp.	Hustedia cf. H. compressa Meek.
Fistulipora ? sp.	

4 AP 277.

Coral ? sp.	Polypora ? sp.
Lithostrotion ? sp.	Archimedes ? sp.
Fistulipora 3 sp.	Productus sp.
Rhombopora sp.	Euomphalus sp.

The presence of the form identified as *Hustedia compressa* seems to show that lot 270 belongs in the Pennsylvanian, perhaps in the Permo-Carboniferous. The ages of the other lots, although without much doubt being Carboniferous, are less certain. While probably no species is common to all three collections, yet in a general way the facies is much the same, and it is quite possible that all represent the same fauna.

It will be observed that only in one case have the forms collected been identified specifically. In many instances the material is too imperfectly preserved to admit of more than the genus being determined. In others the species are distinct from those of the Mississippi Valley sections, and entirely new unless some of them have been described in European and Asiatic publications not included in my bibliography and therefore difficult of reference.

I have consulted freely with Mr. Bassler wherever the Bryozoa were concerned.

CRETACEOUS.

High up on the flanks of the Wolverine and Lynx mountains are black, rather massive, impure sandstones and shales. In the sandstones of Wolverine Mountain, which form great rock piles along the upper parts of the spurs at an altitude of over 1,000 feet above the base of the mountain, were found fragments of dicotyledonous leaves and a part of an indeterminable bivalve. The shales, also, were found to contain a few obscure plant remains. The only positive result obtained is the fact that there are rocks occupying the highest parts in the area, which are at least as young as the Lower Cretaceous and far younger than the rocks of the lower slopes of Wolverine Mountain, where limestones were found containing corals, the stratigraphic value of which is sufficient only to determine the age as either Silurian or Devonian. They rest on the upturned edges of the older rocks and have themselves undergone considerable deformation. Just how much is to be included with these rocks has not been determined. The associated black, carbonaceous, slaty shales are like those closely associated with the rocks regarded as Devonian. The black, sandy beds, in which the fossils were found are unlike those observed elsewhere and resemble the Upper Cretaceous rocks which occur lower down the Yukon. They are entirely different from the Kenai rocks near Rampart and are referred provisionally to the Cretaceous.

TERTIARY.

Rocks determined as Kenai occur along the Yukon above Rampart and are found also for a short distance up the valley of Minook Creek, where they contain a small amount of coal. There are conglomerates, sandstones, and clays resting unconformably on the older rocks. The degree of consolidation is hardly sufficient in some cases to withstand the pick, and prospect holes have been sunk into this formation under the impression that the material belonged to the stream deposits. These rocks are folded, but otherwise are little changed.

QUATERNARY.

The changes in elevation with reference to sea level which the Yukon-Tanana country has undergone have left at various altitudes benches, sometimes of considerable extent, which stand generally in a definite relation to the present drainage lines. An accompaniment of benching has been the deposition upon some of the benches of gravel deposits, part of which are regarded as of Pleistocene age. Benches are prominently developed along Hess Creek and its tributaries, along the Minook, and along the tributaries of Baker Creek. The deposits of the high bench of the Minook, approximately 500 feet above the present stream, are of interest with reference to the occurrence of gold in the tributaries of Minook Creek. The bench gravels of the Baker drainage have proved in some places to be of great economic importance. The description of these gravels and the deposits of the present streams is given elsewhere in this report in the account of the gold placers.

IGNEOUS ROCKS.

The eastern part of the Yukon-Tanana country is characterized by an abundance of intrusive and extrusive rocks of varied composition. There are several batholithic masses varying in composition from granite to quartz-diorite, with numerous apophyses in the country rock. Acid granitic rocks are abundant, and occur commonly in small dikes, some of which are comparatively fresh, while others have been rendered schistose along with the country rock. These become less abundant toward the west and seem to disappear. In the Birch Creek and Fairbanks regions the most common rock of igneous origin is biotite-granite. After crossing the White Mountains no rocks of igneous origin except greenstones were encountered until reaching the immediate vicinity of Rampart. That region has been an area of great igneous activity, in which granitic rocks and more basic granular rocks are common, occurring as small intrusive masses and narrow dikes, and their extrusive representatives are also to be found in small amount. The igneous rocks will not be considered in detail, and only such description will be included as seems necessary for the purposes of this report. They may be grouped roughly as granitic rocks with their surface representatives, monzonitic rocks, greenstones, and basalt with associated glass. The most characteristically developed of them are the greenstones which occur throughout the area. The basaltic rocks so far as observed have but a limited distribution.

GRANITIC ROCKS.

The granitic rocks are not of common occurrence. The most extensive mass observed forms a part of the summit of Wolverine Mountain, where it occupies an area about 1,000 feet wide. It is a porphyritic, massive, gray rock composed chiefly of quartz, phenocrysts of orthoclase a half inch or more in diameter, considerable plagioclase, some biotite and hornblende, and a little pyroxene. The rock is finer grained toward the margin. The slates in contact with it have been indurated and their fracture surfaces are flecked with the products of metamorphism, chiefly andalusite.

A similar rock occurs west of the mountain near the saddle where the trail passes through the ridge to descend toward the Hutlina. This is also a gray porphyritic rock, but the porphyritic feldspars sometimes an inch or more in diameter have a tabular development. The proportion of pyroxene is greater, there is less quartz, and the composition of the rock is transitional to that of the monzonitic rocks. Rocks similar in composition to those of Wolverine Mountain occur also in Lynx Mountain along with monzonitic rocks, but their outcrops were not observed.

A siliceous rock occurs west of Minook Creek about 7 miles from Rampart. It is a finely banded, grayish-brown rock and has been complexly folded on a small scale,

so that in a hand specimen most intricate foldings may be observed. Brecciation has been common, and the interstices of the fragments have been filled with ferruginous matter. The banding resembles sedimentation, but under the microscope the rock is found to be composed almost entirely of minute spherulites clouded with a very minute development of graphic intergrowths. The rock forms a sharply pointed prominent hill rising about 200 feet above the valley. Its relations to the surrounding rocks are not known, but small dikes of a rock composed essentially of quartz and feldspar phenocrysts occasionally occur in a fine-grained, partly graphic groundmass, and it is possible these are derived from the same magma.

MONZONITIC ROCKS.

The most common intrusive is a monzonitic rock which varies in color from dark brown to nearly black. It is a medium to fine-grained rock and the coarser varieties show abundant plates of reddish-brown mica, the most striking mineral present. All the minerals of this rock are fresh and include about equal proportions of an orthoclastic feldspar and of plagioclase which is embedded in the irregular limpid mottled grains of potash feldspar, abundant pale-green monoclinic pyroxene, biotite, and a small proportion of olivine. Hypersthene occurs frequently, its small prisms often fringing the grains of olivine. There is some apatite and often much magnetite.

This rock occurs in Lynx Mountain and in the ridge at the head of Glenn, Rhode Island, and Omega creeks, where it forms a mass of considerable extent. The numerous small dikes of minette-like rock in the slates, from 1 foot to 3 feet thick, containing prominent plates of bleached biotite and a large proportion of nearly colorless prismatic crystals of monoclinic pyroxene, are probably to be referred to this type.

The coarse granular type is similar in composition and texture to the rock found in 1902 by the Brooks party at one locality on the eastern side of the Alaska Range, and this occurrence in the Rampart region is the only one thus far found in the Yukon-Tanana country.

GREENSTONES.

The greenstones include serpentine, altered gabbro, diabase, basalt, and much tuffaceous material, and have frequently been intruded by fresh diabasic rocks. Some show clearly their mode of origin. Others are indefinite aphanitic chert-like rocks. They occur throughout the area from the White Mountains to Rampart. Their dark color contrasts strongly with the associated limestones of the White Mountains; they form the prominent ridge across Beaver Valley to the west of these mountains, and occur in the area between this ridge and the Flats. Farther west they become prominent in the ridge north of Hess Creek. In the Rampart region they form the bed rock in the lower part of Troublesome Valley and are the most widely distributed rocks in the lower valley of the Minook below the mouth of Florida Creek.

The greenstones are partly intrusive and partly extrusive to the rocks in which they occur. Those in association with the limestone are, so far as has been observed, parallel to the structure, and furthermore some of them are altered basalts containing numerous amygdules filled with calcite. Diabasic intrusives occur cutting the serpentine, and in the Rampart region intruding the Rampart slates.

BASALT.

A fresh olivine basalt occurs on Minook Creek about 1 mile above the mouth. On Hunter Creek, a short distance above the mouth, and apparently related to the basalt in their occurrence, are volcanic glasses containing basic feldspar phenocrysts.

SUMMARY.

The greater part of the area is occupied by closely folded sedimentary rocks, and most of these are regarded as of Devonian age. Folding and metamorphism appear

to have been most active in the Rampart region, and some of the rocks have been rendered somewhat schistose, and others have been brecciated by the forces which have been at work. The igneous rocks include both intrusives and extrusives, and are present in great variety and abundance in the Rampart region.

Most of the gold-producing creeks tributary to Minook Creek from the east head in areas composed of slates, quartzites, feldspathic quartzites, chert, and sheared chert derivatives, and flow in the lower parts of their valleys through areas of greenstone, which are largely tuffaceous. The schistose, fine-grained fragmentals, alternating with the slates and quartzites, form the greater part of the bed rock in the valleys of the streams tributary to Baker Creek. The same rocks strike off northeastward and occupy large areas in the valleys of the headwaters of the Tolovana, which were traversed by the Brooks party in 1902, and still farther in the same direction are found in the White Mountain section. There is no essential difference in the bed rock of the northern and southern sides of the divide in the Rampart region, except that the greenstones are confined mostly to the northern side in the lower part of Minook Valley below Florida Creek. Victoria Creek, a tributary of Beaver Creek, where prospects were reported in the fall of 1904, heads in an area of chert, slates, and greenstones, like those of the Rampart region.

The occurrence of gold has not been traced to a definite relation to any particular bed rock or to the quartz seams, which are rather common in the slates. Many of the dikes are more or less mineralized, and some of them are reported to carry values. The light-colored acid dikes of the Fortymile region, with their associated quartz veins, were not observed in the Rampart region. The slates contain generally a large amount of carbonaceous matter, and anthracitic material is common in some of the small quartz seams. Pyrite is often found in both the slates and the quartz seams. On creeks where the conditions are apparently least complex the only rocks observed are the carbonaceous slates with quartz seams, which occasionally are a foot or more in thickness, and the monzonitic intrusives in the ridge about the headwaters. The nuggets have frequently a considerable quantity of quartz attached, and it seems probable that the gold has been derived from the small quartz seams. The only general fact which seems to emphasize itself is that the occurrence of gold in quantities of economic importance is limited to an area where deformation of the rocks has been intense and where there has been much igneous activity.

THE GOLD PLACERS.

By FRANK L. HESS.

GENERAL STATEMENT.

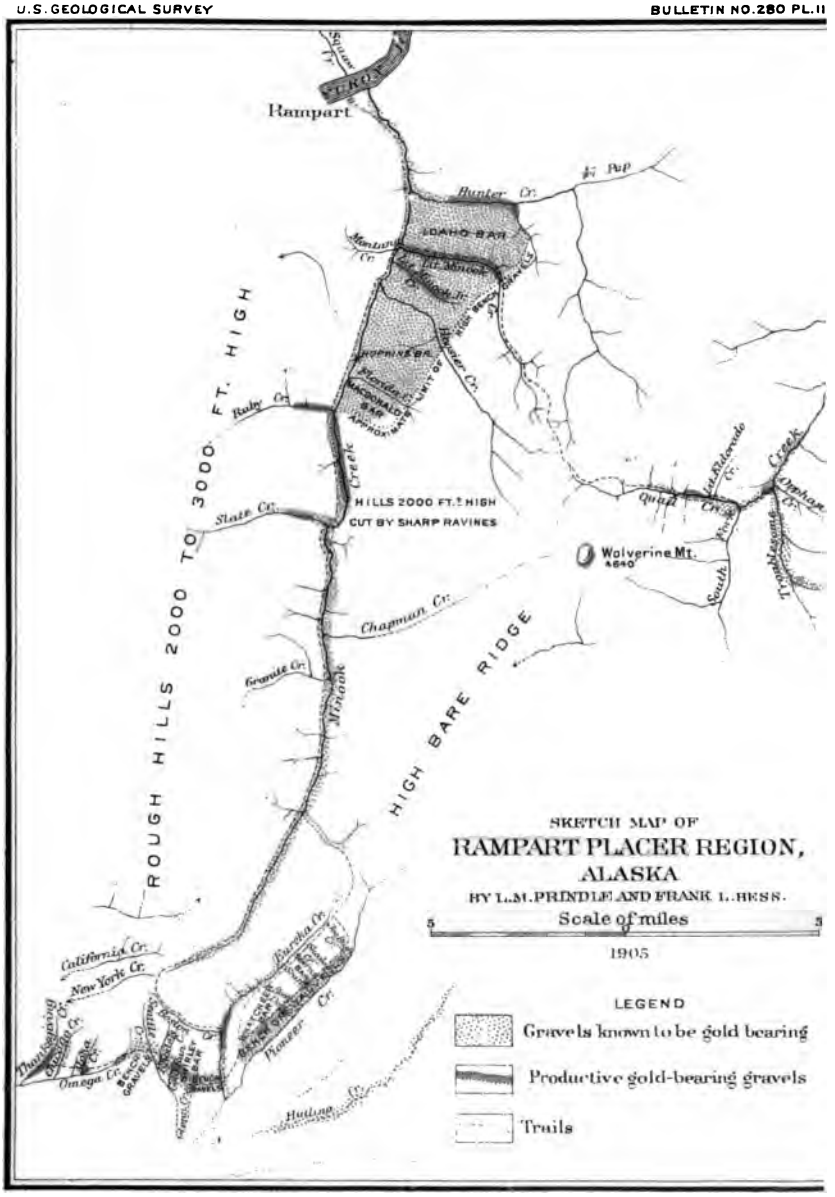
The placers of the Rampart region were studied by the Survey party for ten days during the first part of September, 1904. Every working claim was visited except those on Gunnison Creek, but in a number of cases where claims are worked only during the winter the operators could not be seen. Foot traverses were carried over the region and a sketch map was made (Pl. III). The time allowed only a hasty reconnaissance, though if it had been possible to know the dates of arrival and departure of the boats more time could have been put upon the study of the region. The miners met were universally generous, hearty, and hospitable, ready to help whenever possible with information or otherwise, and the work was thus made much more effective and pleasant.

The placer diggings near Rampart may be grouped according to the drainage systems to which they belong. The three general groups, Minook Creek, Baker Creek, and Troublesome Creek, are separated by a divide having the general shape of a Y whose stem runs northeastward between the Minook and Baker Creek drainage, whose left arm runs nearly northward from Wolverine Mountain, about 13 miles southeast of Rampart (Pl. III), and whose right arm runs nearly eastward, from the eastern base of the mountain. Between the arms, extending northward, is the "Troublesome country", as the region surrounding the creek of that name is known from its steep, rocky ridges and deep, narrow valleys. Each group embraces only the diggings located on the creek that gives the group its name, or upon its tributaries.

In the Minook Creek group most of the gold-bearing creeks are on the east side, nearer the left-hand arm of the Y, only a few diggings being on the west side of the creek. In the Baker Creek group the diggings now known are on the side nearer the Y, and in the Troublesome Creek group the only diggings known are on the west side of the creek, on branches flowing from the left arm of the Y. The extreme length of the area containing known gold-bearing localities is about 30 miles and its greatest width is about 12 miles, the total area being probably less than 350 square miles.

Winter prospecting is being done on Squaw Creek, a tributary of the Yukon about the size of Minook Creek, which enters the river nearly opposite Rampart.

The first placer claim in the Rampart region was located and worked in 1896 on Little Minook Creek by F. S. Langford, though gold had been previously discovered by John Minook, a Russian half-breed, who seems to have sluiced out a small amount of gold, and for whom the creek was named. Some prospecting had probably been done along Minook Creek a number of years before. Since the first systematic work in 1896 the region has been a constantly productive one. Though the


Rampart
Hunter Cr.
Pup
IDAHO BAR
Montana Cr.
Ruby Cr.
HILLS 2000 FT. HIGH
CUT BY SHARP RAVINES
ROUGH HILLS 2000 TO 3000 FT. HIGH
HIGH BARE RIDGE
Wolverine Mt.
4640
Chapman Cr.
Granite Cr.
Ventook
Quartz Cr.
Trouble some Cr.
Orphan Cr.
South Fk.
California Cr.
New York Cr.
Omega Cr.
Pioneer Cr.
Hutlinc Cr.
SKETCH MAP OF
RAMPART PLACER REGION, ALASKA
BY L. M. PRINDLE AND FRANK L. HESS.
Scale of miles
1905
LEGEND
Gravels known to be gold bearing
Productive gold-bearing gravels
Trails

amounts taken out have not been so large as those mined at places in the Klondike district or at a few of the claims near Nome, yet a number of creeks in this region produce a fair amount of gold. At first Little Minook and Hunter creeks were the only producers, and during 1897 no new ground seems to have been found, but in 1898 a small amount was taken out of Quail Creek. Afterwards gold was discovered upon Little Minook Junior, Hoosier, Ruby, and Slate creeks of Minook Creek Valley. In the meantime prospecting was carried on over the divide on the south, and deposits along Baker Flats were discovered. In fact, each year has shown some new source of production, and it seems likely that more may still be found. The output to the fall of 1904, from the best available data, was $1,112,000, and that for the year ending at the same time was about $232,900.

As Rampart lies only about 1 degree south of the Arctic Circle, the cold of winter is severe and the open season is comparatively short. During the early part of June thawing is generally so far advanced that some preliminary work and sluicing can be done. Cold snaps are likely to make the work intermittent at first, but the latter part of June and all of July and August can be depended upon for outside operations. Frosts are likely to occur the first part of September, though mining can sometimes be carried on during practically the whole month. In 1904 the sluice boxes froze up on the 5th of September, and after that date there were only a few days on which sluicing could be done.

The surficial deposits are always frozen, and the limit of the frozen ground has not yet been reached, but there are channels in the frozen gravels through which water circulates freely at all seasons. Large masses of ground ice often occur in the muck, though none are found in the gravels. The depth of the alluvial deposits sometimes exceeds 100 feet, but it is generally less than one-fifth of that amount.

The larger part of the mining has been carried on by drifting and open cuts, depending on the season and the local conditions; but during the season of 1904 two hydraulic plants began active operations, and two more were under construction. Ordinarily, wherever the gold-bearing alluvials are of sufficient depth they are mined by drifting during the winter and the dirt taken out is washed in the spring. In some cases the presence of water interferes very seriously with the drift mining and renders gravels otherwise workable comparatively valueless. Drifting can not ordinarily be carried on in the summer time, because the warm air melts the ground and causes it to cave. In thawing the ground for drift mining steam points have generally superseded wood fires, though the latter are still sometimes used.

During 1904 wages were $5 and board for a 10-hour day. This is equivalent to $6.50 to $9 a day, varying with the locality. The men who work for wages are generally strong and healthy and render a full equivalent for their pay.

The currency of the country, as in the early stages of most placer camps, is gold dust. The different values of the gold from the different creeks makes the fixing of the price at which it should pass rather difficult, and the result is that, while some gold passes considerably below its value, some passes at more than it is actually worth. The gold assays from $14.88 to over $19 per ounce, and passes at $15.50 to $18 per ounce.

MINOOK CREEK GROUP.

This group includes the placers of Minook Creek and its tributaries within limits of 5 to 13 miles from Rampart. Most of the diggings, and much the richest so far discovered in the group, are upon the east side of the valley, and none have been found in the main valley above the mouth of Slate Creek, 11 miles from Rampart.

The hills are generally rounded or flat-topped. The valleys are canyon-like, with steep walls 500 feet or more high, and benches are prominent features of the topography. The larger streams have cut their valleys down to a grade varying from 40 to 80 feet to the mile. The watershed of Minook Valley is narrow on the west, sometimes

not over a half mile or a mile wide, and is probably at no place over 4 miles wide. On the east it is 5 to 7 miles wide through the greater part of the length of the creek.

The total production of the Minook Creek group has been about $702,600, of which $75,500 was produced during the winter of 1903–4 and $10,900 during the summer of 1904, making a total for the year of $86,400.

The surficial deposits are derived from the country rocks, mostly slate, quartzite, and greenstone, and reach occasionally a depth of over 100 feet, though usually much less than that, and there is generally a large proportion of muck.

MINOOK CREEK.

General description.—Minook Creek empties into the Yukon just east of Rampart, and is about 25 miles long. Near its mouth it is a shallow stream 50 or 60 feet wide, with a flow of possibly 200 second-feet or 8,000 miner's inches. It flows in a northerly direction through a deep valley whose width varies from a few hundred feet to about a half mile. The creek receives a number of large tributaries from the east—Hunter, Little Minook, Little Minook Junior, Hoosier, Florida, Chapman—and a number of creeks whose names are unknown. From the west it receives Montana, Ruby, Slate, and Granite creeks and a few small tributaries. Granite Creek, about 17 miles from the Yukon, is the largest western tributary, carrying probably 30 to 40 second-feet; Minook Creek carries perhaps 40 to 50 second-feet at the junction. These approximate estimates are given to convey some idea of the comparative sizes of the streams.

Aneroid barometer readings by Mr. Arthur J. Collier[a] showed a descent of about 760 feet from the "106 road house," about 1½ miles above Granite Creek, to the Yukon. As the distance is about 18 miles, these readings indicate a gradient of about 42 feet to the mile. In the next 3½ miles above he noted a rise of 240 feet, showing a gradient of about 68 feet to the mile. According to Mr. M. E. Koonce,[b] of Rampart, the creek has a fall of about 40 feet in the vicinity of the mouths of Ruby and Slate creeks. Aneroid barometer readings of Mr. L. M. Prindle and the writer showed a somewhat higher grade for the central portion of the creek. It seems likely that Minook Creek has an average gradient of somewhat over 40 feet per mile from the Yukon to Slate Creek and a somewhat steeper gradient above Slate Creek.

Just below the mouth of Slate Creek the Minook spreads into a number of branches in a wide gravel flat. This flat, which is typical of many Alaskan streams, is probably due to a change in the grade of the creek. The stream here is unable to carry the gravels of the swifter water above, and so spreads them upon the flat. Here are found the so-called "winter glaciers," which sometimes last through the short summers. In 1904 a quarter or half acre of ice still remained when the September frosts occurred. This ice owes its origin to the fact that the channel which carries the water is greatly contracted by freezing in the fall. The resulting hydrostatic pressure cracks the ice and the water overflows and freezes. This process is repeated until a considerable thickness of ice is accumulated.

The valley is V-shaped in cross section, and the eastern slope is often benched, while the western is more abrupt and has remnants of benches at but few places. Five well-marked benches rise at irregular intervals above the floor between Little Minook Junior Creek and Hoosier Creek (fig. 1), the highest of which is about 500 feet. These benches are features of much importance in both the physiography and economic geology of the region. Important gravels cover the highest one, which lies on the east side of the Minook and extends from Hunter Creek to about a mile above Florida Creek. It will be described later. A small remnant of the same bench is found on the north side of the mouth of Montana Creek and another on

[a] Personal communication. In giving aneroid barometer readings their lack of reliability is recognized in all cases.

[b] Personal communication.

the north side of the mouth of Ruby Creek. Other remnants are found on the north side of the mouth of Chapman Creek and at a point about 4½ miles above the Chapman on the same side of Minook Creek. The last two benches show no gravel. On the west side of the creek but few remnants of benches are found. One, about 50 feet high, extends to a little above the mouth of Hunter Creek, and is probably an extension of a corresponding bench on the south side of the Yukon. It seems probable that all of the benches of Minook Creek may be more or less closely correlated with the benches of the Yukon. In the vicinity of the mouth of Slate Creek is a bench cut in the upturned slates and thin-bedded quartzites to a depth of 12 to 16 feet and covered by 4 or 5 feet of gravel and a foot or more of muck. No gravel has yet been found upon the benches of intermediate height, but further investigation may show its presence.

In its upper course the creek flows somewhat north of east for about 2 miles, and here the topography of its valley is altogether different from that of the lower part. The north side is a long, gentle slope with a greater rise in the upper part, while the south side is steep and the stream flows near its base. The asymmetry of this part of the valley is repeated in Eureka, Pioneer, Hutlina, Omega, New York, California, and many other creeks of the region whose valleys lie in parallel or nearly parallel directions.

The rocks in the upper part of the valley are mostly closely folded slates and limestones. Garnetiferous schists occur at Ruby Creek, and greenstones form the bed

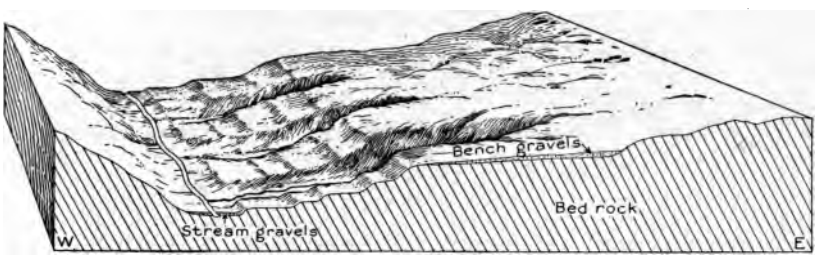


FIG. 1.—Diagrammatic sketch of Minook Valley.

rock of the lower valley except near the mouth, where they are partly covered by the Kenai rocks.

The alluvials of the valley are said to be 10 to 12 feet thick and consist of the usual muck (soil mixed with much vegetal matter), peaty soil, and gravel, with much angular débris at the foot of many of the hillsides. In the middle part of the valley they consist of about 5 to 6 feet of muck and the same thickness of gravel. The muck thickens toward the sides while the bed rock remains about level. The gravel deposits are derived from local bed rock and contain large numbers of smoothly rounded quartzite bowlders from a few inches to 3 feet in diameter, whose source has been a mystery to many. Some of these bowlders have undoubtedly descended to the present creek bed from the high benches already referred to, in whose gravels they are abundant.

The outcrop of quartzite near the "72 road house" would in itself seem sufficient explanation for the bowlders below, but above this point the thinner quartzite beds have added many more to the stream. The quartzites are so hard and their abrasion is so slow that while the other rocks wear into sand and small pebbles, or decompose and are swept away, the quartzite bowlders remain and make up a continually larger proportion of the gravels.

Mining.—Minook Creek has not produced a large amount of gold. The wide valley, large stream, and heavy gravels have made mining difficult, so that men

with the limited means of the ordinary prospector have found it more advantageous to work the smaller streams. The total production to 1904 is placed by miners of the region at $9,900. The gold produced is said to have been taken from the central portion of the valley, partly from bar diggings and partly by drifting, but in general the gravels do not seem to be rich enough for working by pick and shovel methods.

Nothing was learned of the occurrence of gold in the gravels of Minook Creek above the mouth of Slate Creek, except that colors have been found throughout its length. Below the mouth of Ruby Creek colors of gold are said to have been found in the gravels of a bench on the west side of Minook Creek, a few feet above the present stream, but not in paying quantity. The débris here is largely a graphitic slate somewhat schistose and highly impregnated with pyrites. An assay[a] of some of the material gave a trace of silver.

Two small areas worked in the gravels between Ruby and Slate Creeks are said to have given values of about $3 per square yard of bed rock; another small area is said to have given $4 per square yard, and nuggets of values up to $90 are reported to have been found. The gold is stated to be practically all upon bed rock. The width of the gravel in which gold is found is not known, but it is supposed to occur throughout the gravels which floor the valley for a width of half a mile.

A company has been formed to hydraulic this portion of the creek; considerable preliminary work has been done, some pipe, lumber, etc., were on the ground September 20, 1904, and a large amount of pipe and other supplies for the company were brought to Rampart by the steamer *Susie* on her last trip up the Yukon for the season.

Several schemes were on foot for working the gravels in the lower part of the valley near the mouth of Hoosier Creek. One proposition was to work them with a dredger, and another with power scrapers. Little was learned of either plan, but from the roughness of the bed rock dredging would seem a difficult undertaking, except in the limited area in which the bed rock seems to be the Kenai sediments.

HIGH BENCH.

The high bench mentioned on the east side of Minook Creek, the most prominent feature of Minook Valley, needs to be treated here, as on its gravels depends probably in large measure the richness of most of the placers of the Minook region.

This bench, starting at a point about a mile above the mouth of Ruby Creek and about 9 miles in a straight line above the mouth of Minook Creek, continues to Hunter Creek within about 3 miles of the Yukon (Pl. IV, *A*). The eastern line bounding the bench runs about N. 60° E., so that between Hunter Creek and Little Minook Creek the bench has a width of between 2½ and 3 miles. At its extreme eastern side the bench has a height of about 800 feet above Minook Creek, and it slopes toward the west until the height above the stream is only about 500 feet. The surface of the bench is remarkably smooth and continuous between the various streams that have cut across it, and resembles a plain through which deep ditches have been cut. It seems to narrow somewhat and crosses Hunter Creek at the mouth of "47 Pup" continuing in a northeast direction toward the Yukon. Although the writer was unable to follow the bench farther than Hunter Creek, miners assured him that they were able to trace it beyond in a northeast direction by gravels on the surface.

The gravels contain chert, diabasic and metamorphic rocks, vein quartz, and some other pebbles with many heavy quartzite bowlders (Pl. IV, *B*). They are exposed on the sides of the valleys of the different creeks cutting the bench and have rolled down into the present stream beds where the great number of large quartzite bowlders make considerable trouble for the miner.

[a] Burlingame, E. E., & Co., Denver, Colo.

A. VIEW WESTWARD FROM IDAHO BAR DOWN LITTLE MINOOK CREEK.

Showing portion of high bench and intermediate bench.

B. GRAVEL OF HIGH BENCH OF MINOOK CREEK EXPOSED IN TUNNEL ON IDAHO BAR.

The origin of these gravels has been puzzling to the miners and prospectors. Their great width and depth, their position so far above the present gravels of Minook Creek, and the presence of the great quantity of heavy quartzite bowlders, where the bed rock would afford no such material, have made it seem to many miners necessary to assume that some larger stream, possibly the Yukon itself, once flowed across the country. This view received some support from the apparent course of an old channel either toward or from the northeast, while the present stream flows somewhat west of north from the mouth of Hunter Creek.

The data at hand suggest that Minook Creek while flowing toward the Yukon to the northeast of its present course, when the land stood at a lower altitude, had formed a flood plain of approximately the dimensions of the present high bench. With the elevation of the land along the Yukon, the effects of which are to be seen over hundreds of miles, the mouth of Minook Creek may have been raised through local variations, its grade may have been lessened, and the former flood plain may have had the gravels under discussion deposited over it. As the elevation went on, the creek was forced to the west and finally found a new outlet to the Yukon. The elevation continued, and Minook Creek cut downward, leaving its gravels on a bench above it. The elevation did not, perhaps, proceed steadily but periodically, and thus intermediate benches were formed.

The smaller creeks, Hunter, Little Minook, and Hoosier, all give some support to this hypothesis. By reference to the map (Pl. III, p. 26) it will be noticed that each of them, upon reaching the edge of the bench gravels, sharply changes its course and flows westward through the high bench. In the case of Hunter Creek and Little Minook Creek the change in direction amounts to about a right angle, while with Hoosier Creek the angle is less acute but still noticeable. The eastern limit of the bench gravels probably marks the mouths of the various streams when this line represented the course of Minook Creek. As the course of Minook Creek was shifted to the west the tributary creeks followed under the influence of the same force that shifted the larger stream. The age of the bench is probably Pleistocene, as is shown by vertebrate fossils found in the gravels of Little Minook Junior Creek, which seem to be the oldest gravels of the streams cutting the bench.

Gold has been found in the bench at many places, and between Little Minook Creek and Hunter Creek a large amount of prospecting has been done. This portion of the bench is known as "Idaho Bar." One shaft near the middle of the divide toward their eastern edge is said to have shown the gravels to be over 100 feet thick. Many other prospect holes have been sunk in them at various places, and tunnels were run above Little Minook Creek at their eastern edge. Three claims upon this portion of the bench have been patented. From the bottom of one prospect hole, between Little Minook Junior Creek and Hoosier Creek, $27 was reported to have been taken, but drifting failed to show pay. Above Florida Creek, in the small area of high gravels known as "Macdonald Bar," prospect holes gave colors but no pay Apparently the gravels of the bench are nowhere rich enough to pay for drifting, although if it were possible to get hydraulic water to them cheaply they might, perhaps, be worked at a profit. The aneroid barometer readings, though not very reliable, suggest the possibility of bringing water from a point 3 or 4 miles above the mouth of Granite Creek under sufficient head to work at least a part of these gravels, if prospecting should show them to be rich enough to warrant the expense.

CREEKS CUTTING THE HIGH BENCH.

Hunter, Little Minook, Little Minook Junior, Hoosier, and Florida creeks cut through the high bench just described. Of these, Little Minook Junior and Florida creeks have their channels in large part or wholly within this area, while, as already noted, the other creeks lie partly outside and change their courses noticeably upon reaching it. The three longer creeks head close together in the hills which extend

northward from Wolverine Mountain and divide the Minook drainage from that of Troublesome Creek. Their valleys, even at the heads, are so steep that the trails leading out of them are exceedingly difficult to travel.

Hunter and Hoosier creeks not only have had a sufficiently large flow to cut their canyons, but they did it quickly enough to have since had opportunity to widen them, while Little Minook Creek with its smaller volume has not yet graded its valley sufficiently to do so much side cutting, and Little Minook Junior and Florida creeks lack much of having cut their beds down to grade.

HUNTER CREEK.

General description.—Hunter Creek is the first tributary of any size above the mouth of Minook Creek. It is between 12 and 15 miles long, carries probably a little over 40 second-feet, and flows in a steeply walled canyon-like valley through its whole length. In its upper 7 or 8 miles it flows almost north until it comes to the line of the high bench, when it turns at a right angle and flows west to Minook Creek.

Through the upper part of its course it is a crooked stream with a narrow V-shaped valley, probably indicating a rejuvenated drainage, while at its turn into the high bench the course becomes almost straight, showing a young, rapidly cut valley. It has but one tributary below the bend—Dawson Creek—entering from the south about 4 miles above the Minook. In the lower part of the valley of Hunter Creek the two sides are unlike. On the south side the upper 300 or 400 feet of the valley wall is very steep, almost precipitous. The descent then becomes gentler and forms a broad bench which slopes easily to the creek where it ends abruptly with a face 15 to 40 feet high. This bench is probably to be correlated with the lowest one on Minook Creek. It is covered with gravel, varying in thickness from 5 or 6 feet to 15 feet, and with muck varying in thickness from 1 foot near the creek to 40 feet or more near the hillside.

The creek flows tortuously through its bench, retaining the meanders it had before the bench was formed, and generally is close to the north side of the valley, but occasionally, as about 4 miles above the mouth, it wanders toward the south side, cutting away most of the bench. The valley has a grade in its lower part of 75 to 80 feet per mile.

Gold was discovered in Hunter Creek Valley by William Hunter (for whom the creek is named) in 1896, at a point about 1¼ miles above the mouth. Few definite data were obtainable concerning the gold production of the creek, but it is believed to have been approximately $24,000, of which $3,000 was produced during the winter of 1903–4 and $3,000 during the summer of 1904, a total for the year of $6,000. Hunter Creek has so far not proved to be a rich creek, though gold has been found in the gravels of both the bench and the present stream bed.

At the head of the creek the bed rock is mostly Rampart slate and quartzite; tuffaceous greenstones which predominate in the lower part of the valley are overlain near the mouth by Kenai sandstones and conglomerates. The tuffs contain some rounded pebbles, and a hole 228 feet deep was sunk in them under the impression that they belonged to the frozen muck and gravels of the creek. The rocks are much jointed and contain many small veins of quartz and calcite. Pyrite occurs at many places.

The gravels of the creek are 2 to 12 feet thick and are mostly diabase, slate, and chert pebbles from the bed rock, with many heavy bowlders of quartzite, occasionally reaching 3 feet in diameter. These larger bowlders are residuals from the gravels of the old bench through which the valley is cut. Much of the diabase gravel is angular or subangular. The muck over the gravel varies in thickness from 1 foot in places along the stream to 40 feet or more where the small streams pour their débris upon the valley floor.

A. AUTOMATIC DUMP GATE DISCHARGING, CLAIM NO. 3 BELOW, LITTLE MINOOK CREEK.

B. HYDRAULICKING ON HUNTER CREEK ABOUT 4 MILES ABOVE THE MOUTH.

The ground ice is shown by the darker places in the bank on the left. The bowlders have come from the high bench of Minook Creek, through which Hunter Creek cuts.

Mining.—During the summer of 1904 work was being done on Discovery claim, about 1¼ miles above the mouth of the creek; and on No. 17, a claim about 4 miles above the mouth. Several claims between these were being prospected.

On Discovery claim a flume 2,000 feet long, 30 inches wide, and 20 inches deep carried water to a bench about 16 feet above the creek. The bench was covered by 5 to 6 feet of gravel and over this was 1 to 4 feet of muck. The muck and gravel were practically all sluiced off, and the loose bed rock in which the gold is found to a depth of about 18 inches, was shoveled into sluice boxes. The bed rock is partly a diabase and partly a much-folded brown, cherty shale standing on edge. The large bowlders were moved by hand. Three men ground-sluiced an area 75 by 150 feet in thirty days. The gold is mostly bright, smooth "pumpkin seed," with a few small rough pieces (Pl. VI.) A considerable amount of small barite pebbles and some hematite occur in the concentrates.

On claim No. 17-A a hydraulic plant was installed during the season of 1904. About a mile of combined ditch and flume had been put in, about 3,000 feet of which was flume, 32 by 18 inches, delivering 300 inches of water under a head of about 75 feet. A No. 1 Hendy Giant with a 3-inch nozzle was being used (Pl. V, *B*).

In working the ground the niggerheads and moss are torn up with a team and harrow and washed off with the nozzle. The ground is then left for a week, during which time the muck will thaw 1 to 2 feet. This is then washed off. The process is repeated until the top is removed. The remaining gravel thaws much more rapidly than the muck. It is found that the gravel can thus be thawed and made ready for sluicing much faster than a hydraulic giant working steadily can wash the gravel into the sluice boxes. In one instance an area 125 by 250 feet was worked out in 40 days. The gravels are 2 to 12 feet thick, averaging about 6 feet, and are covered by 1 to 40 feet of muck. The maximum thickness was found at the mouth of a small tributary gulch where the gravel is mixed with angular fragments of rock. The muck contains much ground ice, which thaws readily when hydraulicked. The ice occurs occasionally as "dikes." One such was encountered over 400 feet long and 2 feet thick, intersecting the surface layer of muck and a flat lenticular mass of ground ice down to the gravel, making a depth of 12 to 15 feet.

The gold is found through the lower 3 feet of gravel and in the rough broken bed rock, which is made up of diabase and thin-bedded quartzite. It is bright and smooth, and nuggets up to 10 ounces in weight have been found. There is a small amount of rougher gold. Colors of gold are said to occur throughout the length of the creek, but no workable deposits have been found above the eastern limit of old gravels on the high bench already described. The larger part of the gold has probably been reconcentrated from this bench. The smaller portion of rough gold has probably a local source in the rocks of the creek valley. Drifting is done in the winter at a number of places on the creek, but little information could be obtained as to results.

LITTLE MINOOK CREEK.

General description.—Little Minook Creek empties into Minook Creek about 5 miles from the Yukon and about 1½ miles above the mouth of Hunter Creek, and has so far been the largest producer of the region. In drier years it carries scarcely a sluice head of water. It has a grade of 100 feet or less per mile in the lower 3-mile section to which all the mining has been confined, and its course is remarkable in being nearly parallel to Hunter Creek, though considerably shorter, as it has a length of only about 8 miles. Like Hunter Creek it makes a sharp bend upon entering the high bench about 3 miles from Minook Creek. Above this bend Little Minook Creek has a maturer character, as shown by the more crooked valley and greater number of tributaries, while in its course through the bench it has a straight sharply V-shaped valley

(Pl. IV, p. 30) cut to a depth of 500 to 700 feet, and so narrow that for over three months of the winter the sun can not be seen from the bottom of the valley.[a]

The creek follows closely the southern side of the valley through its lower 3 miles, and mostly the western side above this. It seems likely that the greater accumulation of talus on the north side of the creek is due to the greater amount of sunshine it receives, resulting in a greater amount of breaking down of bed rock by alternate freezing and thawing.

Gold was first discovered upon the creek in the early nineties by John Minook, who is reported to have taken out some gold near the mouth of the creek. The first claim, however, was located and worked by Mr. F. S. Langford in 1896, since which time the creek has been worked continuously. The total production of the creek is calculated, from the best ascertainable figures, to be $486,100, of which $40,000 was taken out during the winter of 1903-4 and $2,900 during the summer of 1904, making the output for the season of 1904 $42,900.

Little Minook Creek heads among slates and quartzites cut by small decomposed acid dikes. A little over a mile below the head, the creek is crossed by a belt of clayey, nonfossiliferous limestone, accompanied, as is often the case with the Rampart rocks, by green fine-grained slates. Below this there is an indistinct series of interbedded quartzites, cherts, siliceous shales, and some sandstones, all greatly contorted and accompanied by large masses of greenstones which form probably the larger part of the bed rock of the lower valley. At the foot of the valley walls the exposure of igneous rocks seems to be greater than in their upper parts; that is, erosion seems to have exposed larger masses of igneous rocks. Small veins of quartz and calcite occur in the rocks, but none of great extent. The rocks of the valley have a considerable impregnation of iron pyrites, the oxidation of which has stained them the familiar rusty brown of iron oxide.

The placer deposits are all in the stream bed. The valley has been cut down so quickly that no bench deposits have formed. The alluvial deposits of Little Minook Creek vary in thickness from 7 to 25 feet, of which gravel forms 3 to 12 feet, and muck, though occasionally absent, generally 3 to 16 feet. The deposits are shallowest in the lower part of the creek. The gravels contain fragments of many rocks, of which diabase is probably most abundant, but slate, grit, and much vein quartz also occur, and there are many large quartzite bowlders from the bench above. Much of the gravel, as would be expected in a weak stream, is subangular.

In the gravels mammalian bones are said to be found, although none were seen by the writer. In places clear ice is uncovered in digging, the structure of the alluvium showing how sudden floods had drifted detritus over the ice in the spring, and had thus preserved it. Locally there is much wood in the muck.

Occurrence and character of the gold.—Values are found in the lower part of the gravels through a thickness of 1 to 3 feet, and a width of 50 to 200 feet. The gold frequently occurs in the bed rock, particularly the broken diabase, to a depth of 1 to 2 feet. The pay streaks extend up the creek only as far as the creek has cut through the high bench gravels, a distance of about 3 miles. There are sixteen 1,000-foot claims within these limits.

The creek has been well prospected throughout its length, and although colors are found there is no pay above the line of the high bench. A small amount of gold, in which were some large nuggets, has been found in the gulches leading from the high bench. The amount of gold carried by the gravels varies greatly, but in the pay streak probably runs from $2 to $10 per square yard. The gold is generally smooth, chunky, and bright (Pl. VI, j, k, l, p. 38), and shows a large amount of wear. In the upper part many nuggets are found weighing 1 to 12 ounces apiece, but the gold gets finer downstream until near the mouth it is nearly all flat, smooth,

[a] Peck, C. W., and Laboskie, Wallie, personal communication.

bright, and even in size, looking like golden bran when seen in quantity. There is a very small amount of rough gold, probably of local origin, but the larger part is probably reconcentrated from the old bench gravels of Minook Creek. The gold of the creeks cutting this bench is said to assay over $19 per ounce. This would make it of about the same value per ounce as the Koyukuk gold. The gold is taken in trade by the stores at $18 per ounce. Some small nuggets of copper and a small amount of silver have been found with the gold.

Mining.—Most of the claims are worked by drifting in the winter, though the three lower ones are worked during the summer by open cuts. On the latter the muck and gravel are first ground-sluiced off within 1 or 2 feet of bed rock by means of a dam and automatic gate (Pl. V, *A*, p. 32), and the remaining gravels are then shoveled into the sluice boxes. The drifted pay gravels have often been "coyoted" or "gophered;" that is, holes have been sunk here and there without system until, although there is probably much pay still left, the ground is frequently almost unworkable on account of the ice in the old holes which floods the new workings when thawed by a steam point. When workings are filled with water, the mass is said to freeze on the top, sides, and bottom, while the central part remains unfrozen through several years. Much of the ground is worked on "lays" or leases, the lessees paying from 25 to 55 per cent of the gross output, an amount that is apt to leave the worker little for his labor if things do not run very smoothly. Freight rates are 2 cents per pound in winter and 4 cents per pound in summer.

The remaining gold in Little Minook Creek would seem to be best recovered by working the claims in cooperation as one company, for it is certain that some of the richer claims can no longer be profitably worked by drifting. The quickest, but an initially expensive, mode of working would be to hydraulic the gravels by bringing water from Minook Creek. A ditch 10 miles in length above the mouth of Little Minook Creek would probably give a head of over 100 feet and plenty of water at the upper limit of the pay gravels. A way requiring less capital, but much slower, and the one that will likely be carried out in the end, is the ground-sluicing of the claims, successively, from the mouth of the creek upward, by means of dams and automatic gates, but as the claims belong to different parties, some of whom are unwilling to sell, there will probably be only a small amount of work carried on along the creek for a number of years to come.

LITTLE MINOOK JUNIOR CREEK.

General description.—Little Minook Junior Creek, between Little Minook and Hoosier creeks, is about 2½ miles long. Its valley lies wholly within the high bench of Minook Creek. It is a weak stream, generally dry during the summer, and rarely carries a sluice head of water. With a valley of hard rocks it has not been able to cut its bed down to the depth reached by the larger tributaries of Minook Creek. In the lower half the grade of the creek is torrential and the valley is narrow with steep sides. In the upper half the grade is much easier and the valley is wider with gentler slopes, especially on the north side. The rocks of the valley are the same as along Little Minook Creek. The lower part is entirely in diabase.

The total output of the creek was estimated by Mr. Donald McLean at about $150,000, and the output for the year 1904 at about $17,000.

The steep grade of the lower part of the creek has allowed little accumulation of alluvium, but in the upper part the deposits have reached a depth of 12 to 30 feet, of which gravel forms the lower 4 or 6 feet. The gravels are angular and largely composed of diabase with well-washed quartzite bowlders from the bench gravels through which the stream has cut.

In the gravels are many bones of bison, musk ox, mammoth, and horse. A very fine specimen of the skull of *Bison alleni*, with the shell still upon the horns, was taken out of Mr. Donald McLean's claim, No. 25, near the head of the creek, by Mr.

McLean and Mr. Thos. Evans. This is the only specimen of this species that has been reported from Alaska. It was carefully removed and is now in the National Museum at Washington. Some teeth obtained by Mr. C. W. Peck from gravel next to bed rock on the same claim and referred to Dr. T. W. Stanton for identification were called by him "horse teeth of Pleistocene or more recent age."

Mining.—There are twenty-nine 500-foot claims upon the creek, numbered from the mouth upward, the upper 9 or 10 of which are said to have paid wages or more upon working. The pay streak is 30 to 60 feet wide and 1 to 6 feet thick, averaging probably 3 feet, but gold is sometimes found through the whole thickness of the gravel. The gravels were reported to carry $10 per square yard on one claim, which is probably the highest value on the creek, the values on other claims running down to amounts too small to pay for working.

The gold is similar to that of Little Minook Creek, mostly smooth and bright with a little that is rough. It is generally coarse and chunky, nuggets sometimes reaching 3 ounces in weight. The larger part of the gold is undoubtedly reconcentrated from the high bench of Minook Creek. The small amount of rough gold has probably had its origin in the bed rock.

The gravels have been mined by drifting with steam points, but advantage was taken of the wet season of 1904 and some ground sluicing was done in gravel and muck 16 feet thick. Trees and brush in the lower part of the creek were cleared away in preparation for further ground sluicing. The cost of mining by drifting is 50 per cent or more of the output, but as there is so little water it has been the only feasible mode of work. The creek is considered to be nearly worked out.

HOOSIER CREEK.

Hoosier Creek flows into Minook Creek from the east side between 5 and 6 miles from the Yukon. It is a stream of about the same volume as Hunter Creek and has a valley of about the same gradient and general section, but it shows no sign of the bench that appears along Hunter Creek. Like Hunter and Little Minook creeks, its course bends to the left upon entering the area of the high bench of Minook Creek, although in a less degree.

The production of Hoosier Creek is unknown. There is assigned to it but $500 in the table (p. 169), $227 of which was in one nugget. Other small amounts have been taken out, but the production has not been large, and it has been almost impossible to thoroughly prospect the creek on account of live water in the gravels.

The bed rock is similar to that of the other creeks cutting the bench. Quartz veins up to 18 inches in width occur in the diabase, and there is some pyrite distributed through the rocks. The alluvial deposits vary in thickness from 6 to 15 feet, of which 1 to 9 feet is gravel, averaging probably about 6 feet, and 1 to 10 feet is muck, averaging perhaps 6 or 7 feet. There is thought to be a pay streak about 100 feet wide whose length coincides with the distance the creek flows through the high bench, but the gravels of the valley are broader than those of the other creeks described, and with the live water the pay is hard to locate.

Two miles above the mouth of the creek a hydraulic plant has been installed and had just gotten in shape to begin work at the end of the season of 1904. A combined ditch and flume 4,300 feet in length delivered 500 miner's inches of water under a head of about 80 feet. A hydraulic elevator is used to dispose of the tailings.

FLORIDA CREEK.

Florida Creek is only about 2 miles long, lying in the high bench of Minook Creek about 2 miles south of Hoosier Creek. Ordinarily it is dry during the summer and fall. The gradient of the stream is high and the valley narrow. The bed rock is almost entirely of diabase. The alluvial deposits are narrow, but in places reach a

depth of 15 or 20 feet. Nuggets up to $33 in value have been taken from the creek, but so far as known not more than a total of $2,000 has been obtained, though the stream has been well prospected. The first prospect showed up so well that miners at once located the whole of the creek, and a number of good cabins were erected on the different claims. Some ground sluicing was done on the lower part of the creek during the season of 1904, but no other work was done.

ORIGIN OF THE GOLD.

The great difference in the richness of the several creeks flowing through the high bench of Minook Creek, and the variation in the richness of claims and size of nuggets on the same creek within the limits of the bench, show that the gold is not evenly distributed through the gravels of the bench. Thus Hunter Creek has so far shown no rich claims, while Little Minook Creek has been very rich in places, and along the latter the gold is very coarse on the upper claims but grows much finer toward the mouth (Pl. VI, j, k, l, p. 38), showing that probably the larger part of the gold in the lower portions of the stream has been washed down from the upper claims. The gold in the bench gravels was probably concentrated from local gold-bearing zones in the rocks worn away above the level of the high bench. How great a thickness of these rocks was disintegrated and carried away can not be told, but there may have been many hundred feet. The rocks were probably the same as those now forming the bed rock. The gold in the bench gravels is said to be well worn, but gold found in the gravels of a stream as large as Minook Creek is generally well worn, and in this case we have no clue as to the length of time through which wearing may have continued.

OTHER TRIBUTARIES OF MINOOK CREEK.

RUBY CREEK.

Ruby Creek flows into Minook from the west side about 9 miles from the Yukon. It is a stream carrying 300 to 500 miner's inches (7.5 to 12.5 second-feet) of water, with a grade of about 150 feet per mile in the lower part. In this part the valley is broadly V-shaped, with steeply sloping sides. The upper part was not seen.

The first pay was taken out of the creek in 1901, and the total product is said to have been $13,000 or $14,000, although this estimate may be a little high. About $5,000 was reported during 1904. No pay has been found above 1½ miles from the mouth of the creek, but it is claimed that no holes have been sunk to bed rock on account of the live water in the gravel.

The bed rock is the calcareous schist, garnetiferous mica-schist, carbonaceous slate, chert, and grit, intruded by greenstones (diabase?). The bedded rocks strike almost north and south across the creek with the dip downstream (east). The alluvial deposits are 6 to 10 feet thick and 300 to 500 feet wide. In some places there is almost no muck and nowhere is its depth more than about 4 feet. The gravels are 5 to 7 feet in thickness and the total thickness of muck and gravel is 6 to 10 feet, averaging nearer the lower figure. No large chert or quartzite bowlders are seen as in the creeks cutting the high bench. There are some gneiss pebbles, which indicate the probable presence of gneiss on the creek. The gravel is comparatively fine but contains a few bowlders a foot or more in diameter.

The gold is all on bed rock and is distributed through the whole width of the gravels. The only gold seen came from a point about one-half mile above Minook Creek. It was somewhat iron stained and in general rougher than the gold of the creeks cutting the high bench. The larger pieces were very smooth, but the smaller pieces were rough and most of the gold is rather flat. The gold is said to be rougher in the claims below. Nuggets up to about 2 ounces in weight are obtained. In the concentrates with the gold are large quantities of garnets that sometimes reach 1 inch

in diameter. A handful of garnets was obtained from a pan of dirt. There are so many of them that they give considerable trouble by filling up the spaces in the riffles and must be cleaned out once or twice a day. Some barite is said to be present, and an occasional silver nugget appears, one weighing 2 ounces having been reported. The silver nuggets are very rough.

It seems likely that the origin of the gold is in the local bed rock, which along this part of the creek is a carbonaceous slate of irregular cleavage. In places much pyrite is distributed through it. The creek has been worked during the summer by open cuts and in the winter by drifting, but it has probably paid little, if anything, more than wages. Preparations were being made to install a hydraulic plant, and a mile of steel pipe, consisting of 720 feet each of 20, 19, 18, 17, 16, 15, and 14 inch pipe with branches of 11-inch pipe for an elevator, and 7-inch pipe for a giant, was to be put in. It was said that it would deliver the water under a head of 154 feet.

SLATE CREEK.

Slate Creek, a western tributary of Minook Creek, about 12 miles from Yukon River, is about 4 miles long and is said to always carry at least a sluice head of water. It has a grade in the lower portion of about 150 feet to the mile, and the valley is narrowly V-shaped.

The creek has been worked only since 1902. Freights from Rampart are 8 cents per pound in summer and 4 cents per pound in winter.

The bed rock in the lower part is much-folded shaly limestone, green and purple slates, and cherty beds, with a northeast strike. The main rock of the valley is a dark graphitic schistose slate which breaks into pencil-like fragments and contains many quartz seams. Most of the work has been done nearly 2 miles above the mouth by drifting in the winter. The deposits here are 26 feet thick.

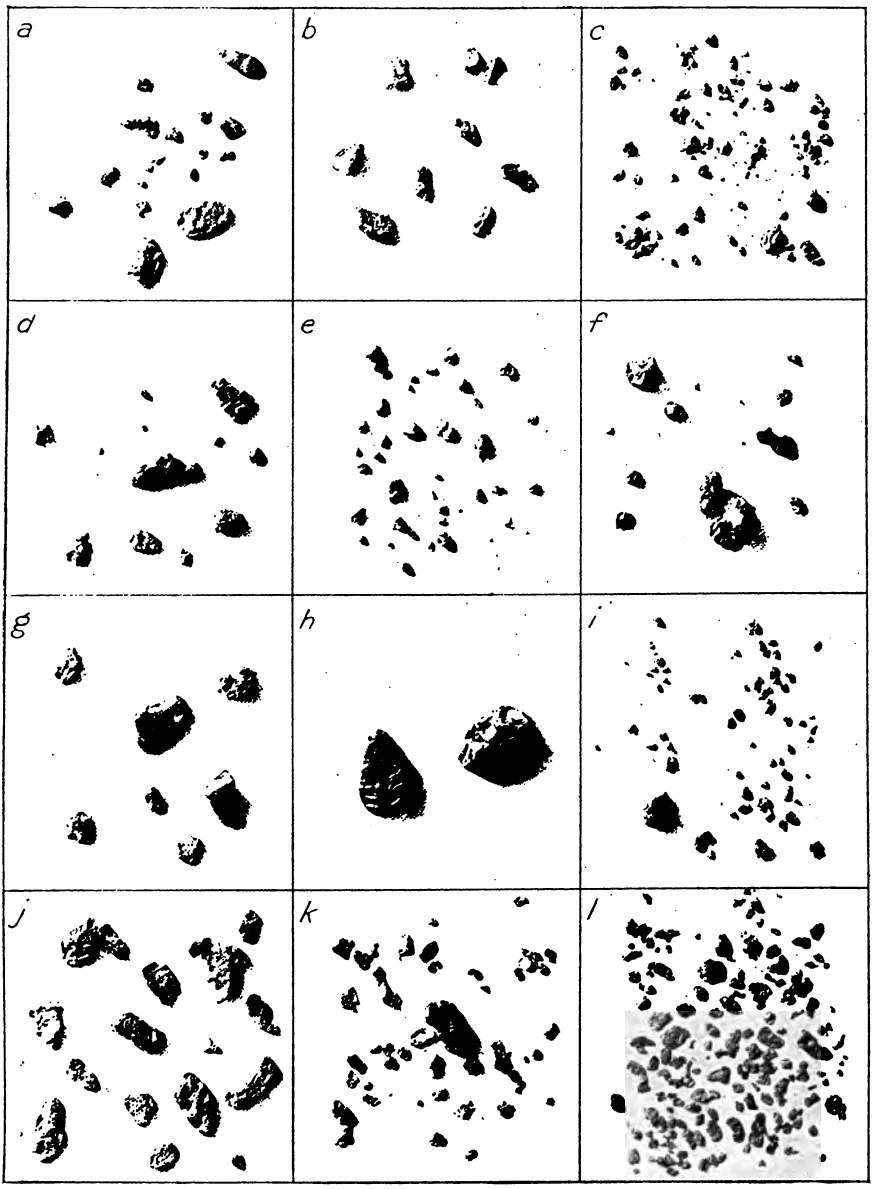
Gold is found in as much as 3 feet of gravel and to a depth of 1½ feet in bed rock and over a width of 50 feet. An $8 piece is the coarsest thus far taken out. Silver is a common associate (Pl. VI, b), and an 8-ounce nugget has been found. Copper also is said to occur in the gravels. The absence of garnets indicates that the schists of Ruby Creek do not extend into the valley. The gold in this case has probably been derived from the small stringers common in the bed rock.

THE BAKER CREEK GROUP.

GENERAL DESCRIPTION.

The Baker Creek diggings are situated from 28 to 32 miles by trail almost south from Rampart, and occupy a narrow belt with a northeast-southwest extension of about 9 miles. Along Baker Creek itself there have been no placers discovered so far, all at present known being on the tributaries flowing from the divide separating the Minook and Troublesome drainages from that of Baker Creek. The principal diggings are located along Pioneer, Eureka, Glenn, Gold Run, Omega, and Thanksgiving creeks.

The topography is strikingly different from that of the other two areas. Baker Creek flows along the southwestern side of a large flat, 7 to 9 miles broad in its widest part, and perhaps 10 miles long, its longer extension being northeast-southwest in the line of flow of Eureka and Hutlina creeks. Instead of sharp canyon-like valleys the streams flow through open valleys, and where they flow in general parallel to the Baker-Minook divide—that is, approaching a northeast-southwest or an east-west direction, the southern bank is steep while the northern one is gently sloping, the creeks flowing close to the steeper side. Even along the broad Baker Flats this feature is still prominent. The north side is a long gentle slope toward the divide, rising more sharply in its upper part, while across the flats the southern side may be seen rising abruptly from the valley floor.



GOLD SPECIMENS.

a. Gold from Discovery claim, Hunter Creek.
b. Native silver from Claim No. 10 above, Slate Creek.
c. Gold from Shirley bar.
d. Gold from Claim No. 1 above, Thanksgiving Creek.
e. Gold from Claim No. 3 above, Thanksgiving Creek.
f. Gold from Claim No. 11 above, Omega Creek.
g. Gold from Seattle bar.
h. Gold from Discovery claim, Doric Creek.
i. Gold from What Cheer bar.
j. Gold from Claim No. 8 above, Little Minook Creek.
k. Gold from Claim No. 3 below, Little Minook Creek.
l. Gold from Claim No. 4 below, Little Minook Creek.

All the specimens are natural size.

The main streams of the Baker Creek gold area are: Eureka Creek, lying next to the Baker-Minook divide, flowing southwesterly for about 5 miles, then turning to the south; Pioneer Creek, flowing parallel to Eureka between 1 and 2 miles to the southeast and joining it on Baker Flats; Rhode Island Creek, flowing in a southerly direction, about 1½ miles west of Eureka Creek; and Omega Creek, in the western part of the gold area. Into these creeks flow all of the smaller creeks of the area along the Baker-Minook divide. The streams are all small, many of the smaller ones being ordinarily dry during the summer and fall. The gradient of the larger streams is comparatively low and it is with difficulty that water is carried to the benches.

The only practical trail to and from the Baker Creek area is from Rampart along Minook Creek, a trail that in most parts of "the States" would be considered practically impassable during the summer time. Most of the way it is soft and miry. The pack horses sometimes sink to their girths, floundering and wallowing their way through. As a choice, there is the bed of Minook Creek along which, if the creek is not too high, the horses can make their way on the bars and through the icy water; but at best this trail is hard on the animals. The foot traveler can not take the creek bed, and if he carries a pack, as he often does, he must make his way along the mucky trail. Over this trail all provisions for the camps are carried. Freight rates, until the summer of 1904, were 25 cents a pound in summer and 6 cents in winter, and it is said that one man had to pay freight on 47 pounds of "grub" and 53 pounds of box and packing at the higher rate. During the summer of 1904 freight rates came down to 15 cents a pound, but the packers declared they could make nothing at that rate, and this is probably true, as hay and oats when cheapest are $100 a ton. There is another trail to the mouth of Baker Creek, but it is said to be bad and is not used.

Lumber is high, most of it being shipped from the States of the Pacific slope. Some is whip-sawed along Baker Creek in the winter, which costs about 20 cents a foot, board measure. It would seem that a small sawmill operated through a portion of the year would be a paying investment, as there is said to be plenty of timber along Baker Creek for local needs.

The total production of the region is estimated to have been about $406,100, of which $84,700 was produced during the winter of 1903–4 and $61,300 during the summer of 1904. These figures are probably under rather than over the actual amount.

Gold was discovered in the Baker Creek area on Eureka Creek, where mining was begun during the winter of 1898–99 and a small amount was taken out. On Glenn Creek gold was discovered in July, 1901, on the benches along Pioneer Creek in 1902, on Thanksgiving Creek in February, 1903, and other discoveries were made during the summer of 1904. Prospecting is in active progress in other valleys of the vicinity, and it is altogether possible that new discoveries may be made.

The rocks of the Baker Creek group show less variety than those of the Minook Creek group. In the gold-bearing region the rocks are schistose arkoses with interbedded slates and with quartzites, the latter in thin strata, generally 1 to 3 feet thick. Both slates and schistose beds are generally graphitic. The strike is northwest and the dip about vertical. No igneous rocks occur except along the top of the divide, where there are some dikes and masses of a monzonitic rock. Quartz occurs generally only in small veins, and these are not prominent. In places there is a considerable amount of pyrite in the rocks in small crystals and grains, but no large masses or veins have been seen.

THE CREEKS AND BENCHES.

EUREKA CREEK.

General description.—Eureka Creek, on which gold was first discovered in this area (in February, 1899), flows southwestward along the foot of the Baker-Minook divide. It runs in a straight southwest course for about 4½ miles, then turns and runs south 2½ miles to its junction with Pioneer Creek. It has a number of small tributaries from the northwest side, but none from the southeast. The largest is Boston Creek, about 2 miles long, which joins Eureka Creek at its bend. The other tributaries are mere rills. Eureka is a small creek carrying barely a sluice head of water above the mouth of Boston Creek during the ordinary seasons. From aneroid barometer readings the gradient of the stream is about 100 feet per mile. The valley slopes gently to the divide on the northwest side, but on the southeast side the slope is almost precipitous, rising 400 to 600 feet above the valley. The creek flows close to the foot of the steeper side.

The gravels of the creek are not much worn, as is characteristic in weak streams, and have been left for a considerable distance, in places at least 500 feet, up the slope of the hill as the stream bed has moved to the southeast. The bench gravels, like those of the present stream bed, are made up entirely of the country rocks. The deposit varies in thickness from 5 to 18 feet, and the overlying muck varies from nothing to 8 feet, the distribution being rather irregular. The total thickness varies from 5 to 20 feet. The gravel contains a considerable amount of very sticky clay, which makes sluicing difficult. The clay seems to come from the decomposition of both the arkose and the slates.

Mining.—Only one claim above and one below the mouth of Boston Creek have so far been made to pay, but prospectors on the bench gravels about 2 miles above the mouth of Boston Creek reported that they had found gold in sufficient quantities to pay for ground sluicing, if not for drifting. On this part of the bench it is 8 feet to bed rock near the creek, and 450 or 500 feet back from the stream it is 20 feet. The elevation above the creek at this distance, as shown by the aneroid barometer, is 70 feet.

The gold is said to be in the lower 18 inches of gravel and in a foot of bed rock. Along the creek the bed rock is largely blocky, and in it gold is found to a depth of 3 feet; but it is not found at such depths where the bed rock decomposes into clay. The gold may be distributed through the gravels to a depth of 4 or 5 feet, but it is generally close to bed rock, which must be scraped.

The larger part of the mining has been done by drifting, but on Discovery claim, just below the mouth of Boston Creek, an open cut is being worked. The muck and upper gravel are ground sluiced through sluice boxes, so as to save any fine gold that may be in them, and the lower gravel is shoveled in. Fifty-seven 12-foot boxes are used, 37 of which contain pole riffles and 2 contain Hungarian riffles. The lower boxes are lined with sheet iron to facilitate the movement of the gravel. Some gold is probably carried off by the sticky clay in spite of the length of the sluice box.

PIONEER CREEK.

General description.—Pioneer Creek heads against the Baker-Minook divide, flows around the head of the Eureka, and then, at a distance of 1 to 2 miles, flows parallel to the main course of that creek. After traversing 7 or 8 miles it joins Eureka Creek and they are said to lose themselves on Baker Flats. Pioneer Creek is larger than Eureka Creek; probably it never carries less than three or four sluice heads of water, and its gradient along its lower course is about 60 feet per mile. The valley is similar to that of Eureka Creek. Its northwest side is a gentle slope running back for about a mile, and the southeast side is of almost precipitous steepness, but not so high.

On the gentle slope of the northwest side there are perceptibly flatter places or benches, but only one of these is persistent. This bench is traceable along Pioneer Creek for over 4 miles. Its northeast end is but little above the present level of the creek while its southwest end is about 250 feet above the creek. Over this bench and covering much of the slope below is a deposit of auriferous gravel left by the creek as it moved to the southeast. The different diggings upon it are known as "bars."

Five small tributaries, Doric, Boothby, Seattle Junior, Skookum, and Joe Bush, flow across this bench at right angles to the course of Pioneer Creek. Near the upper end of the bench at Joe Bush Creek prospect holes showed a well-defined old stream channel. Upstream the bench rises so that a ditch supplying water to What Cheer Bar is below the workings at Seattle Bar, but crosses the bench and is on the upper side when it reaches What Cheer Bar. There can be no doubt that the bench is of stream origin.

Like many other Alaskan creeks Pioneer Creek was staked and then each man waited for his neighbor to do the hard work necessary to locate the pay streak, if there were one. Meanwhile the claims lapsed and were then restaked by other parties, and pay was discovered on What Cheer Bar in 1902. After this discovery pay was found on Doric Creek and at several other points along the bench.

The production of Pioneer Creek Valley to the end of the summer of 1904 was about $35,800.

The bed rock is the same as on Eureka Creek, schistose-arkose, with interbedded slates and thin beds of quartzite. The arkoses sometimes become very graphitic, particularly on Doric Creek. The general strike of the rocks is N. 70° or 75° E., with a steep northerly dip. There is some quartz in small veins and stringers, and on Doric Creek at places there is considerable pyrite distributed through the rocks. The pyrite is often oxidized, so that only small holes lined with iron rust indicate its former presence. On Doric Creek inclusions of a carbonaceous substance the size of a walnut occur with small quartz seams. Little is known of the alluvial deposits along the creek bed. The deposits on the gentle slope already referred to are 3 to 12 feet thick. They consist of the usual muck and gravel, and extend over 2,000 feet back from the creek.

What Cheer Bar.—What Cheer Bar is located in the lower part of Pioneer Creek Valley, about a mile from Eureka Creek, 2,000 feet from Pioneer Creek, and 250 feet above the latter. The season of 1903 was spent in putting in about 4 miles of ditch, with the necessary flumes. This ditch carries about three sluice heads of water to the upper edge of the workings. The ground is excellent for ditching, compared with other Alaska localities, for there is little ground ice and the soil is tenacious enough to make good banks. The bed rock is much jointed and broken and exhibits fine examples of creep, the rock leaning downhill and gradually blending with the gravels.

The average depth to bed rock is about 12 feet. The overlying material is composed of 1 to 1½ feet of muck, 3 feet of rather fine flat wash, 5 feet of medium-sized yellowish gravel, and 3 to 4 feet of rather heavy wash, including some bowlders of vein quartz 2 feet or more in diameter. There are some bowlders of conglomerate similar to that found in Quail Creek, in Troublesome Valley, and it is probable that beds of it outcrop on the headwaters of Pioneer Creek. Most of the gold is found in the lower part of the gravels and the upper 1 or 2 feet of bed rock. It is well worn and bright (Pl. VI, i, p. 38), and probably comes from the bed rock in the vicinity. The largest nugget found weighed somewhat less than 2 ounces and was worth $28. It contained considerable quartz. The gold is taken in trade at $15.50 per ounce.

The muck and upper gravel are ground sluiced and the lower gravel and upper bed rock shoveled in. The water could not be used until August 15, and only fifteen days were available for washing. Fifteen men were employed.

Seattle Bar.—Seattle Bar is about 2½ miles farther northeast on the same bench, on the northeast side of Seattle Junior Creek, and about the same distance back from Pioneer Creek as What Cheer Bar. Pay was discovered here in the spring of 1904. The depth to bed rock is about 9 feet and the bed rock and gravel are similar to those of What Cheer Bar. The gold occurs in the lower foot of gravel and the upper foot or more of bed rock. It is bright, chunky, and well worn. Some of it is rather flat, but all is easily saved. The largest nugget obtained was worth $9.40. Water is obtained for sluicing by a ditch and hose from Skookum Creek, which in a dry year will furnish but a scant supply.

Doric Creek.—Doric Creek is a small tributary of Pioneer Creek about three-fourths mile above What Cheer Bar, and is dry most of the summer and fall. It has an open valley, at its greatest depth probably not over 50 feet below the level of the bench. Gold was discovered here in 1902, and in the winter of 1903–4 a portion of the valley about one-fourth mile from Pioneer Creek was found to be very rich. As with other weak streams its wash shows almost no wear, but there is also a large amount of more rounded gravel from the bench through which it has cut.

Only one claim has produced much gold. Some pay was found on the lower part of the next claim above, but none in the upper part. The richness of the deposit is probably due to the reconcentration of the gold from the gravels of the bench. The ground is worked by drifting during the winter, and the largest bowlders are left in the drifts. It is worthy of note that a large degree of the success obtained in locating this claim was attributed to the remarks upon concentration in the Survey report on the Nome region,[a] which apply with much force to many of the deposits of the Rampart region.

Other bench gravels.—A mantle of gravels similar to that which covers the gentle slope on the northwest side of Pioneer Creek bends around a spur from the divide on the west side of Eureka Creek and continues to Omega Creek, a distance of about 2½ miles. Beyond this point it has not been traced. In the space described the gravels are cut by Glenn Creek, Gold Run, Rhode Island Creek, and Seattle Creek.

SHIRLEY BAR.

The bench gravels have been prospected at many places and shown to carry gold, but at only one point outside of the creeks crossing them have they proved sufficiently rich to pay for working. This place, known as Shirley Bar, is located between Glenn Creek and Gold Run. It is at an elevation of about 200 feet above the lower workings on Glenn Creek, and was first worked in the fall of 1901. The bed rock is the same schistose arkose, slate, and quartzite. The wash is small and subangular, with a few quartzite bowlders and some monzonitic rocks from the divide above. The gravel varies in thickness from 2 feet at the lower side of the claim to 7 or 9 feet in the middle and 5 feet at the upper end. The gold is bright, rounded, and "shotty," well distributed through the gravel, and, though it seems strange, the nuggets come from near the surface. There are few large pieces of gold, the largest nugget taken out weighing a little over 1¼ ounces.

A ditch from Rhode Island Creek, 1 mile long and capable of carrying 2 sluiceheads of water (about 100 miner's inches), has been dug; but water is so scarce that it is collected in a pool after being used and pumped back to the sluice boxes. For this purpose a 30-horsepower boiler, two twinned 4-horsepower upright engines, and a 4-inch centrifugal pump are used. Seven men have been employed on the claim during the season.

[a] Brooks, A. H., and others, Reconnaissances in the Cape Nome and Norton Bay Regions, Alaska, in 1900; a special publication of U. S. Geol. Survey, 1901, pp. 149–151.

A. VALLEY OF GLENN CREEK.

Looking north, showing sluices, etc.

B. VIEW WESTWARD UP QUAIL CREEK FROM THE EAST SIDE OF TROUBLESOME CREEK.

Wolverine Mountain in the background.

GLENN CREEK.

General description.—Glenn Creek is located about 1 mile west of Eureka Creek, and flows across the bench gravels. It is about 3 miles long, running almost south down the slope from the Baker-Minook divide. The valley is shallow and open (Pl. VII, *A*), probably not over 50 feet below the bench. It is practically dry during ordinary summers, but during the wet summer of 1904 it carried water sufficient for sluicing.

Gold was discovered on Glenn Creek by Messrs. Beardsley, Belsea, and Dillon in July, 1901. The total production up to the fall of 1904, according to the most reliable information obtainable, had been about $277,500, not including the output of one claim known to have produced a considerable amount. During the year ending with the fall of 1904 $50,500 is known to have been produced, and this again does not include some smaller outputs. Of the 1904 output $11,000 was obtained by drifting during the winter of 1903–4 and $39,500 during the summer of 1904.

The bed rock is similar to that on the other creeks. The alluvial deposits are 7 to 9 feet thick and are in large part composed of the angular fragments usually found in so weak a stream, with rounded material from the bench through which it flows. There are occasional small bowlders of monzonitic rock from the divide above.

The quartzite interbedded in the softer slates has given rise to a peculiar condition in the gravels of the lower part of the creek. On claim No. 1A a section of the gravels shows about a foot of muck under which is a discontinuous layer of angular quartzite blocks 8 to 10 inches thick and 2 feet or more broad, showing no water wearing. Under these is a thickness of about 2 feet of washed gravel and fine broken slate lies below this upon vertical strata of slate which strike about northeast. These angular blocks of quartzite on top of the gravel have been very puzzling. It is likely that they are to be explained by the supposition that the creep, which acts very strongly here, has broken down a thin bed of quartzite that can be seen on the side of the claim, and as the creep has moved the gravels the blocks of quartzite have been broken off and have crept with the gravels.

Mining.—The pay seems to have been mostly, if not wholly, in that part of the creek which cuts the mantle of gravel covering the hillside. The pay streak is said to vary in width from 50 to 100 feet. In places it was very rich; one pan taken by the writer gave about $3.75. Many pans of $10 and upward were said to have been taken. At one place fine gold could be seen all through the broken slate. On this claim the pay was in the lower 3 feet of gravel and 2 feet of the bed rock. A plat 20 by 48 feet yielded $4,000 to 4 men working three and one-half days.

The gold is bright, clean, generally worn, and fine, but "shotty" and easily saved. Such nuggets as are found generally contain considerable quartz. The largest nugget found weighed nearly 6 ounces. It was bright, clean, beautiful gold, and showed the impression of large quartz crystals. It is said to assay a little over $16 per ounce.

A small ditch 1 mile long brings about a sluice head of water from Rhode Island Creek. Another ditch dug to bring a sluice head or more from Boston Creek was just ready to use when freezing began in the fall of 1904. An average number of 24 men are said to have been employed during the year. Some drifting is to be done this winter (1904–5), but it is said that most of the ground fit for drifting has been worked out, the remaining pay gravels being too shallow to give a good roof. The creek is probably more than half worked out.

GOLD RUN.

A creek, about 1½ miles long, flowing into Rhode Island Creek 1 mile west of Glenn Creek, is called Gold Run. It carries little water at any time and is practically dry during the summer and fall. The valley is shallow and open and the lower part

is cut through the gold-bearing gravels covering the extension of What Cheer Bar. The creek was staked in the spring of 1899 and the first work was done during the winter of 1900–1901. There are six claims, each 500 or 1,000 feet in length, upon the creek, but only the lower four have so far been producers. The total production during the winter of 1903–4, as reported by the miners, was about $16,000, not including the output of one claim, which was probably small. The production of former years is estimated at about $9,000.

The bed rock of the lower part of the creek is a graphitic schistose arkose, which in places becomes slaty. The rather well-rounded gravels are of slate, quartzite, and grit, 16 to 18 feet deep, with a covering of about 2 feet of muck. The creek is difficult to work on account of the live water in the gravels. Through part of their length the gravels are frozen on the bottom and thawed for several feet above, so that drifts must be timbered throughout. The pay frequently goes down into the bed rock 3 or 4 feet.

The gold is generally bright, fine, and somewhat worn. One nugget weighing nearly 4 ounces has been taken out. When poured out of a sack[a] or pan part of it rolls almost like shot, owing to its rounded form. This characteristic is common to a large part of the gold of the Rampart region, but particularly so of this area, and is due to its crystalline form. The crystal faces are often observable on the pieces. The placers of the creek are probably derived largely from reconcentration of the gold from the gravels of the bench through which the creek has cut its course, and in part from the local bed rock. The creek is probably more than half worked out.

RHODE ISLAND CREEK.

Rhode Island Creek is somewhat larger than Gold Run and heads nearer the top of the ridge. Its general conditions of bed rock, gravel, etc., are similar to those of Gold Run, below the mouth of which Rhode Island Creek flows close against a bluff on its western side, while its eastern side rises more gently.

Considerable work has been done on the creek, but during the summer of 1904 no claims were worked. The output is unknown. Miners on other creeks are of the opinion that the gravels would pay for working if water for hydraulicking could be obtained.

SEATTLE CREEK.

Seattle Creek, although the longer stream, is called a tributary of the Rhode Island. It probably carries less than a sluice head of water during an ordinary season. The bed rock in the lower part is graphitic schistose arkose. The gravels contain bed-rock fragments, quartzite, vein quartz, and graphitic slate, and are rather fine. They are said to be 8 to 30 feet thick and covered with 1 to 3 feet of muck. They are well frozen and have no live water. About $100 was taken out in the course of prospecting during the winter of 1903–4. The gold is said to be bright, fine, and shotty. Prospecting was to be continued during the winter of 1904–5.

BENCH WEST OF RHODE ISLAND CREEK.

A spur on the west side of Rhode Island Creek, similar to the one on the west side of Eureka Creek, has a well-defined bench cut upon it, extending about one-half mile to Omega Creek Valley. The bench is about 300 feet above the bed of Rhode Island Creek and is covered with subangular gravel, through which gold is said to be found. It is about on a level with Shirley Bar.

OMEGA CREEK.

General description.—Omega Creek, another small stream, heads in a ridge about 2 miles southwest of the head of Minook Creek and about one-half mile west of Seattle

[a] Known among miners as a "poke."

Creek, flows almost south for one-half mile or more, and then swings gradually to the west. As soon as it takes a westerly course the shape of its valley becomes similar to that of Eureka Creek, having a steep hill on the south, against which the stream flows, and on the north side a gentle slope to the ridge above, rising more steeply in its upper portion.

Gold was discovered in Omega Creek in 1899, but the first pay was found in 1901. The creek has been worked in only a small way, and the production has been small. The bed rock is a black, fissile, much-broken slate, and a yellowish, somewhat schistose arkose. It has a strike of N. 70° E., with a high northerly dip. The gravel is about 7 feet deep, very angular and fine, and is made up of the country rock with a small amount of quartzite. There is little or no muck over the gravel, but there is a sticky clay through it which probably carries off some of the fine gold.

Values and mining.—The pay is known to extend for about 1 mile down the creek from a point due west of the mouth of Seattle Creek. The width of the pay is unknown. One cut 30 feet wide has been taken out, and it is known that the pay extends to both sides, rising on a low bench on the right (northwest). This cut is at the upper end of the pay streak. The gold is distributed through the gravel both top and bottom. It is "shotty" and coarse, and much of it is very rough. Many pieces show crystal faces, and all the larger pieces and many of the smaller pieces contain quartz. In color the gold is more brassy than most of the gold of the region. A great many small crystals of pyrites occur in the concentrates with the gold. So far the claim has been worked only by an open cut, but some of the gravel was thought to be deep enough to be workable by drifting and this method was to be tried during the winter of 1904–5. The water supply is small and a dam has been put in to collect the water so that sluicing can be carried on about half the time during an ordinary season.

CHICAGO CREEK.

Chicago Creek is a small rivulet flowing down the northern slope to Omega Creek about 2½ miles west of the mouth of Seattle Creek. Pay was reported to have been discovered near its mouth during the summer of 1904, and it was the intention to work it during the winter.

THANKSGIVING CREEK.

Thanksgiving Creek is a small tributary of Omega Creek, between 4½ and 5 miles west of Eureka Creek. It occupies a shallow, open depression in the southern slope of the ridge, on the north side of Baker Flats, and can hardly be said to have a valley in its lower part. It is almost dry in the summer and fall. Gold was discovered on it in February, 1903. The combined output of Omega and Thanksgiving creeks has been about $18,200.

The bed rock is exposed only in the diggings, but where seen was a yellowish, somewhat schistose arkose. The gravel varies in depth from 6 to 18 feet where the creek is worked, though it is said to be deeper farther downstream. It is composed of subangular pieces of quartzite, schistose arkose, vein quartz, slate, and a small amount of monzonitic rock. The overlying muck is 1 to 4 feet in thickness.

The gravel is peculiarly mixed with a sticky yellow clay, which in places seems to be half ice. In some of the deeper holes there is 10 feet of this mixed clay and ice. It can not be worked with wood fires, for when melted it runs down upon the fires and quenches them. In open cuts the sides when melted move together like a mass of yellow tar. In some of the holes the section is said to show 10 to 12 feet of finely mixed yellow clay and ice, of which 5 feet is fully half ice and below this there is 6 feet of subangular gravel. The pay streak varies in width from 25 to 45 feet, and is 1½ to 9 feet thick. Gold is sometimes distributed through the yellow clay and colors always occur through the mixture of clay and ice. At one place where

the pay is found through 7 feet of the ice-clay mixture, when the mass is thawed the pay sinks to the lower 4 feet. If the clay is dried it is difficult to part the gold from it, and at one claim, on which open-cut work was progressing, angular pieces of sheet iron like saw teeth were driven into the poles used in the sluice boxes to break up the clay. The iron pieces were left projecting about three-fourths of an inch, and 25 were used to a 6½-foot pole. The device is said to work well.

The gold is generally rough and somewhat iron stained, but some of it is smooth, bright, and "shotty." Some "black sand" is said to be with it in the concentrates. Mr. R. H. Wright picked out 8.48 ounces of the smooth, bright gold, and the United States Assay Office at Seattle gave it a value of $15.64 per ounce. In it there were 1.68 ounces of silver and 0.4 ounce of impurities; 32.03 ounces of the gold as it came from the sluice boxes contained 6.38 ounces of silver and 2.41 ounces of impurities, and had a value of $15.17 per ounce. Each assay gives about 20 per cent as the silver content of the gold.

Water for sluicing is brought from Eureka and Chicago creeks, but the supply is scanty. The probabilities are that the production of gold upon Thanksgiving Creek will increase considerably, but as in most of the diggings of the Baker Creek group more water is needed.

HUTLINA CREEK.

Hutlina Creek is a large tributary of Baker Creek, several miles southeast of, and having a generally parallel course to Pioneer Creek. As seen from Glenn Creek its valley and that of its principal tributary are shaped similarly to those of Pioneer and and Eureka creeks, and prospectors confirm this impression. A stampede to the Hutlina occurred in 1902, and it is reported that colors and occasionally good prospects were found, but live water in the gravels prevented their being worked without machinery. The bed rock is said to be similar to that of Pioneer Creek. At the time the Geological Survey party left Rampart, September 20, 1904, several prospectors were going into the valley with tools and provisions to prospect the benches during the winter.

WATER FOR HYDRAULICKING.

A large part of the gravels of the creeks and benches of the Baker Creek area, while they will not pay for shoveling in, would probably pay for working if water for hydraulicking could be obtained at a reasonable cost. But, as has been said, the creeks of the region are small and furnish hardly enough water for ordinary sluicing operations.

Miners say that Hutlina Creek would furnish plenty of water for hydraulicking, but the distance it would have to be carried is variously estimated at 8 to 15 miles. Were water brought from this creek it would have to be piped through a large part of the distance to retain the head. In connection with hydraulic mining in this region the writer can do no better than quote the remarks of Mr. L. M. Prindle[a] upon the subject:

Outlook for hydraulicking.—The installation of a hydraulic plant in any of the placer regions of the Yukon-Tanana country involves the expenditure of an amount of money several times in excess of that required for similar work in the states and should be preceded by much careful preliminary study of all the conditions. The transformation of available water supply into a powerful tool of excavation and transportation and the use of this tool in the most skillful and efficient manner are among the most important problems of mining. Lack of knowledge and skill may be covered by the results where the ground is very rich, but with ground like that under consideration the possession of these qualities or the lack of them may make all the difference between success and failure. Directors and stockholders of companies planning such work should insist upon and be constantly ready to bear the expense of the intelligent study of conditions and careful management of operations.

[a] Prindle, L. M., and Hess, F. L., The Rampart placer region, in Report on progress of investigations of mineral resources of Alaska: Bull. U. S. Geol. Survey, No. 259, 1905, pp. 104–119.

GENERAL CONCLUSIONS.

The rocks of the Baker Creek area are interbedded schistose arkoses, slates, and quartzites, with the arkoses forming the larger part. The arkoses and slates are often graphitic. Igneous rocks were found only along the crest of the divide, and not in large quantity. When compared with the Klondike or the Nome gold-producing regions, the small amount of metamorphism and mineralization and the scarcity of quartz veins and stringers are very noticeable.

The source of the gold is probably local, and the richer placers are generally in the vicinity of graphitic phases of the rocks. There is frequently reconcentration from older gravels where the streams cut across gravel-covered benches and hillsides. The gold, though generally close to bed rock, is sometimes distributed through a considerable thickness of gravel and muck. It often occurs in small crystals, and is thus shotty and chunky and easy to save. Large nuggets are rare. It contains a large amount of silver, so that its value per ounce is much lower than that of the gold of the Minook Creek area, running from $14.88 to a little over $16. There are few minerals accompanying the gold, a little pyrite, magnetite, and hematite being the only ones noticed.

The creeks are all small and some have been half worked out or more, but new deposits have been discovered each year and more will probably be found. Water for working the claims is scarce, and, although some ground which will not pay for shoveling in would probably pay for hydraulicking under favorable conditions, water in adequate quantity and under a sufficient head can not be obtained without considerable expense. One of the greatest needs is a good road from Rampart, and until that is made supplies must continue excessively high.

THE TROUBLESOME CREEK GROUP.

GENERAL DESCRIPTION.

The Troublesome Creek group is situated between the arms of the Y formed by the divides separating the drainage basins of Minook, Baker, and Troublesome creeks. It is 18 or 20 miles southeast of Rampart. Troublesome Creek, rising among the hills east of Wolverine Mountain, flows northeast to Hess Creek, a tributary of the Yukon. The tributary valleys are often narrow and shut in by hills with steep sides and ridges, closely resembling each other, and making traveling so difficult that the country has come by its name honestly.

So far pay dirt has been found upon two creeks, Quail and Gunnison, though colors are found through the gravels over a wide area.

The rocks include all the varieties present in the Rampart formation, but slates are characteristic of the upper valley and greenstones of the lower. The slates have been intruded by a variety of igneous dikes. The creeks have cut benches upon the hills, but to a less degree than in Minook Valley.

CREEKS PROSPECTED.

QUAIL CREEK.

Quail Creek heads opposite Hoosier Creek and flows eastward into Troublesome Creek, having a length of between 5 and 6 miles (Pl. VII, *B*, p. 42). A large branch known as South Fork joins Quail Creek about a mile above Troublesome Creek. Between the two branches is a gravel-covered bench 400 feet high, upon which colors have been found, and which is being prospected. Parts of this bench occur at various places farther up Quail Creek. On the north side of Quail Creek is another bench about 50 feet above the creek, and this too is being prospected. In one hole bed rock was reached at 29 feet. There were 19 feet of muck and 10 feet of well-washed gravel. Colors were found all through the gravel, but no pay.

A number of igneous dikes which cross the lower part of Quail Creek show considerable mineralization by metallic sulphides. An assay of a porphyry gave no gold, but 0.52 ounce of silver[a] per ton.

The creek was located in 1898, and it is said that it was desired to call the stream "Ptarmigan" Creek, but as no one in the party could spell ptarmigan it was named "Quail," the spelling of which was easier. Some gold is said to have been taken out in that year, and a little was taken out during the summer of 1904. The total is thought to be about $3,300.

There seems to be a considerable accumulation of gravels at some places, while at others the bed rock rises to the surface. The gravels are of the country rock, with many bowlders of porphyritic granitoid rocks.

A number of miners were fixing up old cabins and building new ones, and getting ready to prospect the creek during the winter.

GUNNISON CREEK.

Gunnison Creek is located a few miles farther down Troublesome Creek on the same side as Quail Creek. Miners are said to have worked upon it during the summer of 1904, and to have taken out some gold, but no further particulars were learned. The creek was not visited by the Geological Survey party.

GENERAL SUMMARY.

The alluvial deposits formed from the rocks of the valleys in which the deposits occur are found both in stream channels and on benches, and are probably all of stream origin. They are of Recent and Pleistocene age, and their thickness is generally near 5 feet, but varies from 5 to 100 feet.

The gold is generally found in the lower 2 or 3 feet of the gravel and upper 1 or 2 feet of the bed rock, but on Shirley Bar and Omega Creek it is in places distributed through the whole depth of the gravel, 5 to 7 feet, and on Omega Creek the gold is found not only in the gravel but through several feet of intimately mixed ice and clay.

The placers are of two general types as regards their origin, placers of ordinary concentration from the disintegration and wearing down of the bed rock, and placers formed through reconcentration of the gold in older gold-bearing gravels by the cutting of streams. The bench gravels of the region and the placers of Ruby and Slate creeks belong to the first class. To the second class belong the placers of the creeks cutting the high bench of Minook Creek and the placers of Doric, Glenn, and Seattle creeks and Gold Run. The other placers of the region probably belong to the first class, although there may be some reconcentrated gold in Thanksgiving and Quail creeks.

The gold of the reconcentrated placers is generally smoother and brighter than that from the others, contains less quartz and iron, owing to abrasion and oxidation, and is thus higher in value per ounce, though the higher value of the gold of the Minook group is principally due to its containing less silver than the gold of other creeks. There is much crystallization in the gold, particularly of the Baker Creek group, where the gold contains a large percentage of silver. It is notable that along Minook Creek, where the gold contains so little silver, native silver nuggets are found in the placers, while in the Baker Creek group, where the placer gold contains about 20 per cent of combined silver, there are no silver nuggets. The only other minerals known in the concentrates with the gold are hematite, a small amount of magnetite on Thanksgiving Creek, pyrite, garnets on Ruby Creek, barite on a few other creeks, and copper on Hunter, Little Minook, and Slate creeks.

In all cases the matrix of the gold has probably been in the immediate neighborhood of the placers, though it may be the result of the concentration of many hun-

[a] Burlingame, E. E., & Co., Denver, Colo.

dreds of feet of bed rock. There seems to be no indication that the gold has been derived from any great "mother lode," and it has probably come from comparatively small veins distributed through the country rock.

All of the creeks at present known to be gold bearing to a paying extent, except Slate and Ruby creeks, take their rise in the Minook-Baker-Troublesome divide. Along this divide are dikes of monzonitic, dioritic, and acid igneous rocks, and it may be that these were associated with causes that introduced gold-bearing solutions into the rocks. The large mass of diabasic rocks in the Minook group may have been related in some way with the mineralization of that area.

As to the origin of the silver and copper nuggets with the gold in the creeks of the Minook group, little can be said. On all the creeks in which they are found, except Slate Creek, both limestones and diabases occur. On Slate Creek diabase was not seen, although there is much of it on Ruby Creek. It is likely that the silver and copper nuggets come from the oxidation of contact minerals resulting from the diabasic intrusions.

The average depth of gravel worked is probably between 10 and 20 feet. The gravels are mostly frozen, but much trouble in working them is sometimes had on account of live water. Hydraulicking has been introduced and apparently works well in the frozen gravels. This form of mining will probably become of considerable importance in the Minook Creek group wherever plenty of water and head are obtainable. In the Baker Creek group the expense of obtaining water for hydraulicking seems to be very much greater, though data are lacking. There is much gravel in this group, which can probably be worked at a profit only by this method. In the Troublesome country there is plenty of water, with sufficient fall for hydraulicking in that valley.

The following tables give the most important statistical data of the Rampart region and include the total gold production, so far as ascertainable, up to the fall of 1904:

Distances, men employed, and freight rates of Rampart region, 1904.

Name of diggings.	Distance from Rampart.	Number of men employed.	Freight rates.	
			Winter.	Summer.
	Miles.		*Cents per pound.*	*Cents per pound.*
Minook Creek				
Hunter Creek	3	15	2	4
Little Minook Creek	4½	30	2	4
Little Minook Junior Creek	5	10	2	4
Hoosier Creek	6	7	2	4
Florida Creek	8			
Ruby Creek	9	10	3	6
Slate Creek	11	5	4	8
Eureka Creek	28	40	6	15
Bench bars	30		6	15
Doric Creek	30		6	15
Glenn Creek	30	24	6	15
Gold Run	31	10	6	15
Seattle Creek	31		6	15
Omega Creek	32	3	6	15
Thanksgiving Creek	34	10	6	15
Quail Creek	20	5	6	15–20
Total		169		

Gold production of Rampart region to fall of 1904.

Name of diggings.	Winter of 1903–4.	Summer of 1904.	Total, 1904.	Previous to 1904.	Total to fall, 1904.
Minook Creek	.....	.....	.....	$10,000	$10,000
Hunter Creek	$3,000	$3,000	$6,000	18,000	24,000
Little Minook Creek	40,000	2,900	42,900	443,200	486,100
Little Minook Junior Creek	17,000	.....	17,000	133,000	150,000
Hoosier Creek	500	.....	500	1,500	2,000
Florida Creek	.....	.....	.....	2,000	2,000
Ruby Creek	3,000	2,000	5,000	8,500	13,500
Slate Creek	12,000	3,000	15,000	.....	15,000
Eureka Creek Bench bars Doric Creek	45,500	16,500	62,000	23,300	85,300
Glenn Creek	11,000	39,500	50,500	227,000	277,500
Gold Run	16,000	.....	16,000	9,000	25,000
Seattle Creek	100	.....	100	.....	100
Omega Creek Thanksgiving Creek	12,100	5,300	17,400	800	18,200
Quail Creek	.....	500	500	2,800	3,300
Total	160,200	72,700	232,900	879,100	1,112,000

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[Bulletin No. 280.]

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SPENCER, A. C. The Juneau gold belt. In Bull. 284.

——— and WRIGHT, C. W. The Juneau gold belt, Alaska, by A. C. Spencer, and a reconnaissance of Admiralty Island, Alaska, by C. W. Wright. Bull. No. 287.

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TOPOGRAPHIC MAPS OF ALASKA.

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Fortymile quandrangle; scale, 1:250000. E. C. Barnard.

Grand Central Special, Seward Peninsula; scale, 1:62500. T. G. Gerdine.

Juneau Special quadrangle; scale, 1:62500. W. J. Peters.

Nome Special, Seward Peninsula; scale, 1:62500. T. G. Gerdine.

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Cape Nome and adjacent gold fields; scale, 1:250000. Contained in a special publication of the United States Geological Survey, entitled "Reconnaissances in the Cape Nome and Norton Bay regions, Alaska in 1900." Washington. Government Printing Office, 1901. E. C. Barnard.

Chitina and lower Copper River region; scale, 1:250000. Contained in a special publication of the United States Geological Survey, entitled "The geology and mineral resources of a portion of the Copper River district, Alaska," Washington. Government Printing Office, 1901. T. G. Gerdine and D. C. Witherspoon.

Cook Inlet, head of, to the Tanana via Matanuska and Delta rivers, also part of Kenai Peninsula; scale, 1:625000. Contained in "A reconnaissance from Resurrection Bay to Tanana River, Alaska, in 1898." Twentieth Ann. Rept., pt. 7, 1900, pp. 265–340. W. C. Mendenhall.

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DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

RESULTS

OF

SPIRIT LEVELING IN THE STATE OF NEW YORK

FOR THE

YEARS 1896 TO 1905

INCLUSIVE

BY

S. S. GANNETT AND D. H. BALDWIN

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TS OF SPIRIT LEVELING IN THE STATE OF NEW YORK FOR THE YEARS 1896 TO 1905, INCLUSIVE.

By S. S. GANNETT and D. H. BALDWIN.

INTRODUCTION.

The readjustment in 1903 of the precise-level net in the eastern portion of the United States by the United States Coast and Geodetic Survey necessitated a corresponding readjustment of all spirit-level heights of the United States Geological Survey dependent thereon. These results will be summarized by States or groups of States and published from time to time in bulletin form.

All results of leveling in New York State previously published in appendices to reports of the Director of the United States Geolgoical Survey and in Bulletin No. 185, as well as levels not previously published, have therefore been readjusted, rearranged by quadrangles, and collected herewith in one publication. Descriptions and elevations of bench marks are given in nearly every county, furnishing vertical control for fully eight-tenths of the total area of the State.

The field work was done in cooperation with the State of New York, under the direction of Mr. H. M. Wilson, geographer, United States Geological Survey, by various topographers and levelmen of the United States Geological Survey. to whom due credit is given under the different headings listed in the following pages.

The office work of adjustment was principally done by Mr. D. H. Baldwin, topographer, assisted by C. B. Kendall, field assistant, under the supervision of Mr. S. S. Gannett, geographer in charge of the triangulation and computing section.

The elevations are arranged according to the degree of accuracy of their determination, precise and primary, the former being determined by lines of levels run either in both the forward and backward directions or by simultaneous double-rodded lines, using a high-grade instrument and taking special precautions in observations and reductions to correct errors and make the line continuously good throughout; and the latter or primary levels being determined with the Y level with precautions taken against the principal errors and run mostly in circuits of single lines.

The allowable limit of error observed on the precise work already done by the Geological Survey in this State is represented in feet by $0.03\sqrt{D}$, and that for the primary work by $0.05\sqrt{D}$, in which D is the length of circuit in miles.

The bench marks described in the following lists are of three general forms. First, a circular bronze or aluminum tablet 3½ inches in diameter and one-fourth inch thick, appropriately lettered, having a 3-inch stem cemented into a drill hole, generally in the vertical walls of public buildings, bridge abutments, or other substantial masonry structures. The second form, employed where masonry or rock is not accessible, consists of a hollow wrought-iron post 4 feet in length and 3½ inches in outer diameter, split at the bottom and expanded to 12 inches, so as to prevent both the easy subsidence of the post and its being maliciously pulled out of the ground. The iron is heavily coated with asphalt, and *over the top of the post* is riveted a bronze tablet similar to that described above.

The third form (used in 1896 and 1897) was a copper bolt 4 inches long and 1 inch in diameter fastened into masonry or solid rock by driving it on a brass wedge placed in the bottom of a vertical hole, so that the top of the bolt was horizontal and thus formed the bench mark.

The numbers stamped upon the bench marks as described in the following lists represent the elevations to the nearest foot above mean sea level, as determined by unadjusted levels in the field. In some cases the finally accepted elevations as printed herein differ from those submitted as bench-mark numbers by several feet, resulting from the adjustments necessary to close circuits and to those resulting from reduction to mean sea level through readjustment of the precise-level net of the United States. This method of numbering bench marks has been adopted where many levelers are working in the same area at the same time, as less liable to lead to confusion in identification of bench marks than any attempt at serial numbering, and because the bench-mark number at the same time gives an approximate statement of elevation. It is assumed that engineers and others finding these bench marks so stamped in the field will communicate with the Director of the United States Geological Survey or the State engineer of New York in order to obtain the accepted elevation to hundredths or thousandths of a foot.

Any person finding bench marks in the following lists mutilated or destroyed will confer a favor by notifying the Director, United States Geological Survey, Washington, D. C.

PRECISE LEVELING.

FRANKLIN COUNTY.

DICKINSON, HOGANSBURG, KILDARE, LONG LAKE, MEACHAM LAKE, AND ST. REGIS QUADRANGLES.

The elevations published in the following list are the result of a line of precise leveling run north from Tupper Lake to a connection with a primary bench mark of the Deep Waterways Commission at Fort Covington, Franklin County, a 2-inch square cut on east abutment of the Grand Trunk Railway bridge over Salmon River 1 foot from the south and east edges. The elevation of this is accepted as 166.452 feet above mean sea level, as derived by the United States Coast and Geodetic Survey adjustment in 1903 of the precise level net. The elevations are corrected in agreement with this, but no error has been distributed in this line.

The double-simultaneous method was employed with a Buff & Berger precise level. The leveling was executed by Mr. C. H. Semper, levelman in charge. All standard bench marks are referred to the Albany datum and are stamped with the letters "ALBANY" in addition to the figures of elevation and year.

TUPPER LAKE JUNCTION, VIA MOIRA AND BOMBAY, TO FORT COVINGTON.

LONG LAKE QUADRANGLE.

	Feet
Tupper Lake Junction, New York Central Railroad, Adirondack division, in foundation to water tank; aluminum tablet stamped "1555 ALBANY"	1,556

KILDARE QUADRANGLE.

Kildare, 350 feet north of station, in large bowlder 8 feet east of rail; bronze tablet stamped "1528 ALBANY 1900"	1,527

ST. REGIS QUADRANGLE.

Blue Pond, in front of station; top of rail	1,552
Blue Pond, 5 miles north of, 1,300 feet north of mile post "T. 18 & O. 110," in large bowlder 10 feet west of track; bronze tablet stamped "1551 ALBANY 1900"	1,551
Brandon, in front of station; top of rail	1,603
Brandon, 1 mile north of, 0.4 mile north of milepost "T. 23 & O. 105," in large bowlder 10 feet west of track; bronze tablet stamped "1595 ALBANY 1900"	1,594

MEACHAM LAKE QUADRANGLE.

	Feet.
Loboeuf, 0.3 mile north of, in large rock 125 feet north of section post 14-15, and 50 feet east of railroad; bronze tablet stamped "1556 ALBANY 1900"	1,555.690
Spring Cove, in front of station; top of rail	1,342.6
Santa Clara, in front of station; top of rail	1,337.4
Santa Clara, 0.7 mile north of, 750 feet north of milepost "T. 37 & O. 91," in large rock 10 feet east of railroad; bronze tablet stamped "1306 ALBANY 1900"	1,306.086

DICKINSON QUADRANGLE.

St. Regis Falls, 1,000 feet south of station, in large rock 20 feet west of railroad and 300 feet north of railroad water tank; aluminum tablet stamped "1256 ALBANY 1900"	1,256.497
Dickinson Center, in front of station; top of rail	954.5
Dickinson Center, 3.6 miles north of, in large rock on east side of railroad at culvert No. 18, 25 feet east of rail, 5 feet north of track; aluminum tablet stamped "603 ALBANY 1900"	602.642

HOGANSBURG QUADRANGLE.

Moira, Methodist Episcopal Church, in east face of; aluminum tablet stamped "420 ALBANY 1900"	419.450
Bombay, public school on Main street, in northwest face of; bronze tablet stamped "193 ALBANY 1900"	193.144
Fort Covington (Deep Waterways primary bench mark), Grand Trunk Railway bridge over Salmon River; chiseled square, 1 foot from south edge and 1 foot from east edge of east abutment	166.453
Fort Covington, Grand Trunk Railway bridge over Salmon River, 600 feet west of station, top of south end of east abutment; bronze tablet stamped "167 ALBANY 1900"	166.452

ALBANY, SARATOGA, AND WARREN COUNTIES.

LUZERNE, NORTH CREEK, SARATOGA, AND SCHENECTADY QUADRANGLES.

The elevations published in the following list are the result of a line of precise levels run from United States engineers' bench mark in Schenectady to a bench mark at North Creek, upon which certain primary leveling republished in this bulletin was formerly based.

These descriptions are republished from the Appendix to the Twenty-first Annual Report of the Geological Survey, Part I, but 0.427 foot has been added to the elevations there listed in accordance with the 1903 adjustment of the precise-level net.

The double-simultaneous method was employed with a Buff & Berger precise level. The leveling was done by Mr. E. L. McNair. The standard bench marks set in the course of this work are stamped with the letters "ALBANY 1899," in addition to the figures of elevation.

SCHENECTADY, VIA THE DELAWARE AND HUDSON RAILROAD, TO NORTH CREEK.

SCHENECTADY QUADRANGLE.

	Feet.
Schenectady, New York Central and Hudson River Railroad bridge over Erie Canal, northeast corner of coping stone of abutment; bronze tablet stamped "242 ALBANY 1899" (set in August, 1899)	241.195
Ballston Lake, 0.75 mile north of, coping stone at west end of stone culvert under railroad; aluminum tablet stamped "269 ALBANY 1899"	269.116

SARATOGA QUADRANGLE.

Ballston Spa, Saratoga County court-house, foundation stone 4 feet left of main entrance; aluminum tablet stamped "320 ALBANY"	320.848
Saratoga Springs, Loughberry Lake, surface of water	283
Saratoga Springs, Delaware and Hudson Railroad station, 1,500 feet south of, at east end of north abutment of steel-girder bridge over Congress street, in coping stone; aluminum tablet stamped "314 ALBANY 1899"	314.410
Greenfield station, 0.33 mile north of, at southeast corner of stone culvert under railroad, in coping stone; aluminum tablet stamped "596 ALBANY 1899"	596.343
Kings, 0.8 mile north of station, at northeast corner of stone culvert under railroad, in coping stone; aluminum tablet stamped "602 ALBANY 1899"	602.834

LUZERNE QUADRANGLE.

	Fe
Hadley, 1.5 miles south of, at northeast corner of stone culvert, about 600 feet west of red house on west side of highway, in coping stone; aluminum tablet stamped "634 ALBANY 1899"	634.309
Hadley, 3.25 miles north of, at northwest corner of steel-girder Bridge No. 9 over Wolf Creek, in coping stone of bridge seat; aluminum tablet stamped "630 ALBANY 1899"	630.458
Stony Creek, 0.4 mile south of, at northwest corner of steel-girder Bridge No. 10 over Stony Creek, in coping stone of bridge seat; aluminum tablet stamped "600 ALBANY 1899"	600.427
Thurman, 1.25 miles north of station, at west end of south abutment of steel-girder Bridge No. 13, in coping stone; aluminum tablet stamped "628 ALBANY 1899"	628.264

NORTH CREEK QUADRANGLE.

"The Glen," Delaware and Hudson Railroad station, 530 feet north of, at southwest corner of a steel-girder Bridge No. 14, 5 feet west of girder, in coping stone of bridge seat; aluminum tablet stamped "749 ALBANY 1899"	749.510
Riverside, 230 feet north of station door, 65 feet west of center of main track, in large, flat rock outcrop 25 feet west of road; aluminum tablet stamped "883 ALBANY 1899"	883.643
North Creek station, 0.4 mile southeast of, bridge seat at southeast corner of steel-girder Bridge No. 18, 4.4 feet below east rail; aluminum tablet stamped "1001 ALBANY 1899"	1,001.491
North Creek station, 1,000 feet north of, in quarry outcrop on southwest side of track, 2 feet above track and 6 feet from southwest rail; bronze tablet stamped "1012" (set in 1896)	1,008.048

JEFFERSON, LEWIS, AND ONEIDA COUNTIES.

ANTWERP, BOONVILLE, CARTHAGE, CLAYTON, LOWVILLE, PORT LEYDEN, REMSEN, THERESA, AND WATERTOWN QUADRANGLES.

The elevations published in the following list are based upon the Greenbush bench mark, the elevation accepted for which is 13.863 feet above mean sea level. The initial point upon which these levels depend is a bronze tablet set in the coping at the north end of retaining wall between lower mill dam and Rome, Watertown and Ogdensburg Railroad at Remsen, N. Y., stamped "1172;" the elevation of this bench mark is derived by a readjustment of primary circuits published in the Appendix to the Twentieth Annual Report of the Geological Survey, Part I, starting from a bench mark of the precise-level net at Utica, and its elevation is accepted as 1,171.464 feet above mean sea level.

A closure was made at Limerick on a temporary bench mark on the south parapet wall of stone-arch bridge over Perch River. This bench mark is on a primary circuit tied at Clayton to bench mark "A" of the precise line of the Deep Waterways Board, being a copper bolt in the water table at the southwest corner of the Catholic Church. The elevation of the latter, as corrected in the 1903 adjustment by the Coast and Geodetic Survey, is accepted as 278.815 feet above mean sea level.

The elevation of the Limerick bench mark, as determined by the primary circuit, is 317.06 feet and by the precise line 317.09 feet above mean sea level. The latter elevation is accepted for this bench mark, the closure 0.03 foot being well within the closure error of the primary circuit. The list, therefore, as here presented, is the unadjusted mean results of double-rodded simultaneous precise leveling. The instrument used was a Buff & Berger precise level with an 8-second vial. The leveling was done by Mr. C. H. Semper, levelman in charge, during the months of August and September, 1900. All standard bench marks dependent on this datum are stamped with the letters "ALBANY," in addition to figures of elevation and year. The elevations marked are mostly 1 foot low, an error caused in the field work by using an erroneous elevation published in the Appendix to the Twentieth Annual Report of the Geological Survey, Part I, page 354, for the Remsen bench mark, which is low by a clerical error of 1 foot, as noted in Bulletin No. 185.

REMSEN, ALONG THE ROME, WATERTOWN AND OGDENSBURG RAILROAD, TO LIMERICK.

REMSEN QUADRANGLE.

	Feet.
Remsen, between lower milldam and Rome, Watertown and Ogdensburg Railroad, north end of retaining wall, in end of coping, face near corner; bronze tablet stamped "1172"	1,171.464
East Steuben, in front of station; top of rail	1,247.7
Steuben, at road crossing near station; top of rail	1,273.4
Alder Creek, milk station, 100 feet south of railroad station, west side of railroad, in south end (east face) of wall; bronze tablet stamped "1253 ALBANY 1900"	1,254.385

BOONVILLE QUADRANGLE.

Boonville, canal Lock No. 71, at railroad station, top of west wall, south end; bronze tablet stamped "1120 ALBANY 1900"	1,121.306

PORT LEYDEN QUADRANGLE.

Leyden, in front of station; top of rail	1,007.4
Port Leyden, Hotel Brunswick, opposite station, front face in brickwork; bronze tablet stamped "897 ALBANY 1900"	898.400
Lyons Falls, in front of station; top of rail	843.7
Glenfield, railroad station, front face of; bronze tablet stamped "776 ALBANY 1900"	777.639
East Martinsburg, in front of station; top of rail	761.3

LOWVILLE QUADRANGLE.

Lowville station, 1,000 feet south of, railroad Bridge No. 756 over creek and highway, west side north abutment; bronze tablet stamped "863 ALBANY 1900"	864.512
Lowville, in front of station; top of rail	868.8

CARTHAGE QUADRANGLE.

Castorland, 1,200 feet south of station, bridge over creek, top of north abutment, west side; bronze tablet stamped "736 ALBANY 1900"	737.761
Castorland, in front of station; top of rail	746.2
Deer River, in front of station; top of rail	741.2
Carthage, iron highway bridge over Black River, end of bridge rail 10 feet west of railroad, top of wing wall, east end; bronze tablet stamped "741 ALBANY 1900"	742.143
Carthage, in front of station; top of rail	737.4

ANTWERP QUADRANGLE.

Great Bend, in front of station; top of rail	654.8

THERESA QUADRANGLE.

Felts Mills, south abutment of Island Bridge over north channel of Black River, on east end of bridge seat; bronze tablet stamped "583 CAPE VINCENT"	582.456
Black River, in front of station; top of rail	564.5

WATERTOWN QUADRANGLE.

Watertown, 2 miles west of, 100 feet north of railroad and 600 feet south of paper mill, stone culvert under railroad, top of masonry, north end; chiseled square	381.77

CLAYTON QUADRANGLE.

Limerick, stone-arch bridge over Perch River; point on east end of south parapet wall	317.09

ALBANY, ALLEGANY, BROOME, CATTARAUGUS, CHEMUNG, OTSEGO, SCHENECTADY, SCHOHARIE, STEUBEN, AND TIOGA COUNTIES.

AMSTERDAM, APALACHIN, BATH, BERNE, BELMONT, BINGHAMTON, CAMERON, CANASERAGA, CHERRY CREEK, COHOES, COOPERSTOWN, CORNING, DELHI, DUNKIRK, ELMIRA, GOWANDA, HORNELLSVILLE, NINEVEH, OLEAN, ONEONTA, OWEGO, REDHOUSE, RICHMONDVILLE, SALAMANCA, SCHENECTADY, SCHOHARIE, SHONGO, SIDNEY, AND WAVERLY QUADRANGLES.

The elevations in the following list are the result of a line of precise levels run between Dunkirk and Binghamton over the line of the Erie Railroad and between Binghamton and Cohoes over the line of the Delaware and Hudson Canal Company's Railway. Between Dunkirk and Elmira the line carried eastward was based on the top of the water table of Nelson Block, Dunkirk, and all bench marks in this portion of the line are stamped with the legend "D 1898" in addition to their figures of elevation, thus referring them to the Dunkirk datum. The section between Cohoes and Elmira was run westward based on the old Gristmill bench mark near Albany, and are stamped "A 1898" in addition to the figures of elevation, thus referring them to the Albany datum.

The double-rodded, simultaneous, direct and reverse method was used, with a Buff & Berger precise level, and the rods used were targeted on one side and self-reading on the other. The result of the targeted line in each section was used alone as the adopted line, that face having been tested, the line employing the self-reading faces being used as a check. The closure at Elmira between the two lines was 0.645 foot, but there is a greater difference between the datum of figures stamped on the bench marks on account of an error of 1 foot in the elevation started with in the east section, which was not detected until work was finished.

The elevations used for the aforesaid bench marks prior to 1899 were derived by subtracting 1.085 from the elevations then used by the army engineers, and the aforesaid closure represents the error between the Geological Survey line and the old data furnished by the army engineers, which are now superseded by the recent precise leveling.

The differences of elevation between the various bench marks as shown by the duplicate rodded lines was very small, the final divergence being — 0.196 foot for the direct line going eastward and — 0.224 foot for the direct line going westward, making a total closure of the target upon the self-reading rod lines + 0.028 foot at Schenectady. This divergence is far within the limit set for precise leveling.

This line is composed of six elementary lines used in the 1903 adjustment of the precise-level net by the United States Coast and Geodetic Survey, which adjustment supersedes its former adjustment of 1900, in which this line formed but one link, and the previous local adjustment by the Geological Survey deriving elevations for these bench marks published in the Appendix to the Twentieth Annual Report of the Geological Survey, Part I. From Dunkirk eastward the six main junctions with other level lines are at Salamanca, Hornellsville, Elmira, Binghamton, Bainbridge, and Rexford Feeder Bridge (Schenectady).

The corrected elevation for the Nelson Block bench mark is now accepted as 588.866 feet above mean sea level, and the unadjusted line raised to accord with the latter has now been corrected at the other junctions aforesaid, respectively, by the following amounts: +0.250, + 0.286, + 0.236, + 0.232, + 0.161 and — 0.005; the corresponding distances from Dunkirk being 44.1, 129.3, 187.7, 246.3, 283.6, and 381.8 miles. The algebraic difference between consecutive figures of the first or second lines is the amount distributed or the distance between those points, respectively.

The leveling was done by Mr. E. L. McNair (now topographer) in the field season of 1898.

DUNKIRK, ALONG THE ERIE RAILROAD, TO ELMIRA.

DUNKIRK QUADRANGLE.

	Feet.
Dunkirk, St. Mary's Home and School, Washington avenue, between Third and Fourth *streets, in water table 20 feet* from northeast corner; aluminum tablet stamped "598 DUNKIRK *1899*"	598.300
Dunkirk, Nelson Block, extreme northwest corner of, on top of water table; chiseled cross	588.866

CHERRY CREEK QUADRANGLE.

	Feet.
Sheridan, in front of Erie station; top of rail	758.3
Forestville, 530 feet west of entrance to waiting room of Erie station, at northeast corner of iron bridge over highway, in bridge seat, 7 feet north of center of track; bronze tablet stamped "871 D" possibly restamped "1348 D"	871.888
Forestville, in front of Erie station; top of rail	875.5
Smiths Mills, in front of Erie station; top of rail	1,010.7
Smiths Mills, 2.3 miles east of, 10.5 feet north of center of railway track, under west end of overhead highway bridge; bronze tablet in foundation stone stamped "1097 D 1898"	1,098.628

GOWANDA QUADRANGLE.

Perrysburg, in front of Erie station; top of rail	1,265.1
Perrysburg, 400 feet east of waiting room of Erie station, in keystone at north end of arch culvert under railway; bronze tablet stamped "1261 D"	1,262.417
Dayton, 950 feet north of Erie station, 37.5 feet east of center of track, coping of tunnel underneath Erie track, second stepstone from top; bronze tablet stamped "1322 D"	1,322.926
Dayton, in front of Erie station; top of rail	1,337.1
Cattaraugus, Union school building, in water table at right of main entrance; bronze tablet stamped "1401 D" (possibly restamped "1384 D")	1,385.631
Cattaraugus, in front of Erie station; top of rail	1,415.2
Little Valley, Cattaraugus County court-house, foundation wall at southwest corner; aluminum tablet stamped "1593 D"	1,594.244
Little Valley, in front of Erie station; top of rail	1,566.5

REDHOUSE QUADRANGLE.

Elkdale, in front of station; top of rail	1,464.3
Salamanca, 3.25 miles west of, at southwest corner of iron-girder bridge, bridge seat; bronze tablet stamped "1413 D"	1,413.771

SALAMANCA QUADRANGLE.

West Salamanca, in front of flag station; top of rail	1,372.6
Salamanca, in front of Erie station; top of rail	1,387.5
Salamanca, Union school building on Maple street, in water table at right of entrance; aluminum tablet stamped "1391 DUNKIRK 1899"	1,391.485
Killbuck, in front of flag station; top of rail	1,385.6
Carrollton, in front of station; top of rail	1,391.0
Carrollton, 475 feet east of Erie station, west pier of Buffalo, Rochester and Pittsburg Railway iron bridge crossing over Erie tracks; bronze tablet stamped "1393 D"	1,394.641
Vandalia, in front of Erie station; top of rail	1,407.8
Allegany, 1.8 miles west of Erie station, on stone arch culvert under Erie Railroad, 75 feet east of road crossing, south end of next to top step; bronze tablet stamped "1408 D"	1,408.938

OLEAN QUADRANGLE.

Allegany, in front of Erie station; top of rail	1,415.8
Olean, in front of Erie station; top of rail	1,430.4
Olean, city hall and post-office building on State street, northwest corner of, stone next under water table; bronze tablet stamped "1450 D"	1,451.790
Hinsdale, in front of Erie station; top of rail	1,493.5
Hinsdale, 2.25 miles east of, bridge seat of small girder bridge, 9.5 feet northwest of center of track; bronze tablet stamped "1508 D"	1,509.288
Cuba, in front of Erie station; top of rail	1,534.9
Cuba, 0.5 mile east of Erie station, at south end of pier of stone arch bridge over Union street; aluminum tablet stamped "1517 ALBANY." (This is a new tablet set in 1903 in old hole.)	1,516.789

BELMONT QUADRANGLE.

Friendship, in front of Erie station; top of south rail	1,532.1
Friendship, Union school building, water table at right of main entrance; aluminum tablet stamped "1520 D"	1,521.036
Belvidere, in front of Erie station; top of north rail	1,378.7
Belvidere, 0.67 mile east of, south end of wing wall of abutment at east end of railway bridge over Van Campen Creek, 28 feet south of center of track; bronze tablet[a] stamped "1351 D"	1,352.243
Belmont, southeast corner of Allegany County jail, in stone foundation; aluminum tablet stamped "1416 D"	1,417.765
Belmont, in front of Erie station; top of south rail	1,384.8

[a] The above tablet has been destroyed and another has been set in a building (see primary list).

SHONGO QUADRANGLE.

	Feet.
Scio, in front of Erie station; top of south rail	1,454.2
Wellsville, at east end of Erie station; top of north rail	1,519.6
Wellsville, Union school building, in footstone of arch over northeast corner entrance; aluminum tablet stamped "1519 D"	1,520.514
Andover, 3 miles west of, stone step of iron-girder railroad Bridge No. 8; bronze tablet stamped "1573 D"	1,574.208
Andover, in front of Erie station, main track; top of south rail	1,650.2
Andover, 2 miles east of, stone foundation at southeast corner of small railway bridge; bronze tablet stamped "1675 D"	1,676.105
Tip Top Summit, opposite water tank; top of south rail	1,773.2

CANASERAGA QUADRANGLE.

Alfred, 0.4 mile west of, east end of Bridge No. 4 over road and creek; top of north rail	1,607.7
Alfred, Erie station, water table under front office window, facing track; aluminum tablet stamped "1610 D"	1,611.391

HORNELLSVILLE QUADRANGLE.

Almond, in front of Erie station; top of rail	1,395.0
Almond, 950 feet east of Erie station, bridge foundation at northwest corner of small railroad bridge over highway; aluminum tablet stamped "1383 D"	1,382.914
Hornellsville, in front of Erie station; top of rail	1,152.8
Hornellsville, 0.7 mile east of Erie station, foundation wall at northeast corner of iron railroad bridge; aluminum tablet stamped "1141 D"	1,142.481
Canisteo, in front of Erie station; top of south rail	1,128.0
Canisteo, 2.1 miles east of, bridge seat at northeast corner of iron-girder Bridge No. 87; aluminum tablet stamped "1113 D"	1,114.092
Adrian, in front of Erie station; top of south rail	1,101.7

BATH QUADRANGLE.

Adrian, 3.7 miles east of, in face of rock cliff on east side of Erie Railroad and highway, 400 feet northeast of highway bridge across Canisteo River, 25 feet from east rail; bronze tablet stamped "1080 D"	1,081.183

CAMERON QUADRANGLE.

Cameron, in front of Erie station; top of north rail	1,047.8
Cameron, 180 feet west of Erie station, in stone foundation of railroad water tank; bronze tablet stamped "1048 D"	1,048.915
Cameron Mills, in front of Erie station; top of north rail	1,033.3
Rathbone, general merchandise store of F. G. Martin (building owned by O. O. Whittemore), foundation stone at right of main entrance; bronze tablet stamped "1006 D"	1,007.041
Rathbone, in front of Erie station; top of south rail	1,008.6

CORNING QUADRANGLE.

Addison, in front of Erie station; top of north rail, west-bound track	985.5
Addison, 0.4 mile east of Erie station and 750 feet northwest of tracks, Union school building, at right of main entrance; aluminum tablet stamped "1021 D"	1,022.554
Erwins, in front of station; top of rail, east-bound track	965.2
Painted Post, 0.8 mile west of, in masonry wall of open culvert, east wall of culvert and south side of railroad track; bronze tablet stamped "935 D"	936.195
Painted Post, in front of Erie station, east-bound track; top of south rail	938.4
Corning, in front of station; top of rail	936.3
Corning, city hall, corner of Erie and Cedar streets, foundation stone under water table at right of Cedar street entrance; aluminum tablet stamped "935 D"	936.759
East Corning, in front of station; top of south rail	909.3

ELMIRA QUADRANGLE.

Big Flats, 1.25 miles west of, in bridge seat at southwest corner of Erie Railroad Bridge No. 67 A; bronze tablet stamped "899 D"	900.815
Big Flats, in front of Erie station; top of south rail, west-bound track	910.8
Horseheads, in front of Erie station, west-bound track; top of north rail	903.4
Horseheads, 0.35 mile southwest of Erie station, on pier of Lackawanna Railroad bridge at crossing of Northern Central Railway, 50 feet south of center of north-bound track of Northern Central Railway; aluminum tablet stamped "901 D"	902.111

	Feet.
Horseheads, Northern Central station; northeast corner of stone doorsill of men's waiting room	900.113
Elmira, Erie station, east-bound track, opposite distance board; top of south rail	857.3
Elmira, city hall, corner of Church and Lake streets, stone pedestal of lamp-post at left of Lake street entrance; aluminum tablet stamped "857 ALBANY"	858.626

ELMIRA, ALONG THE ERIE RAILROAD, TO BINGHAMTON.

Elmira, 0.5 mile east of Erie station, in stone foundation at west end of Erie Railroad bridge across Chemung River, between nearest east-bound tracks; head of iron bolt, chisel mark	854.593

WAVERLY QUADRANGLE.

Wellsburg, 1,800 feet west of station, at southeast corner of Bridge No. 55, in coping stone of abutment; aluminum tablet stamped "824 A"	823.204
Wellsburg, in front of station, east-bound track; top of south rail	825.2
Chemung, 1 mile west of station, at northeast corner of Bridge No. 53 across Chemung River, in coping stone of abutment; aluminum tablet stamped "804 A"	803.077
Chemung, in front of Erie station, west-bound track; top of north rail	811.3
Waverly, in front of Erie station, west-bound track; top of north rail	829.9
Waverly, city hall building on Broad street, stone column between doorways; aluminum tablet stamped "840 A"	839.336

OWEGO QUADRANGLE.

Barton, in front of Erie station, west-bound track; top of north rail	797.6
Barton, 1.2 miles east of, southeast corner of Bridge No. 40, in coping stone of abutment; aluminum tablet stamped "798 A"	797.517
Smithboro, in front of Erie station, west-bound track; top of south rail	793.1
Tioga Center, in front of Erie station, west-bound track; top of south rail	797.7
Owego, 2.25 miles west of Erie station, southeast corner of Bridge No. 37, in coping stone of abutment; aluminum tablet stamped "815 A"	815.028
Owego, 700 feet west of station, west-bound track at crossing of Ithaca branch of Lackawanna Railroad; top of north rail	816.6
Owego, in front of Erie station, west-bound track; top of north rail	816.9

APALACHIN QUADRANGLE.

Owego, 2.75 miles east of Erie station, northwest corner of Bridge No. 33, in coping stone; aluminum tablet stamped "812 A"	811.679
Campville, in front of station; top of north rail	824.9
Union, 1.4 miles west of, northwest corner of Bridge No. 31, across Nanticoke Creek, in coping stone of wing wall of abutment; bronze tablet stamped "825 A"	828.353
Union station, in front of station, east-bound track; top of south rail	835.2
Hooper, in front of station; top of south rail, west-bound track	834.5

BINGHAMTON QUADRANGLE.

Lestershire, in front of station, east-bound track; top of south rail	848.1
Binghamton, Broome County court-house, west end of, at left of basement entrance from Collier street; aluminum tablet stamped "867 A"	866.056
Binghamton, in front of Erie and Delaware and Hudson station, west-bound track; top of north rail	863.5
Binghamton, 1 mile east of, at crossing of Delaware and Hudson and Syracuse, Binghamton and New York railroads; top of south rail	852.6

BINGHAMTON, ALONG THE DELAWARE AND HUDSON CANAL COMPANY'S RAILROAD, TO SCHENECTADY.

Port Crane, 3.25 miles west of, 900 feet west of road crossing, in parapet wall at east end of culvert under railway; bronze tablet stamped "959 A"	958.519
Port Crane, in front of station; top of north rail	1,041.8
Sanitaria Springs, in front of station; top of north rail	1,117.0
Sanitaria Springs, 0.33 mile east of station, northeast corner of Bridge No. 107 over highway, in coping stone of abutment; bronze tablet stamped "1126 A"	1,125.617

NINEVEH QUADRANGLE.

Tunnel, 0.5 mile west *of station*, at southeast corner of Bridge No. 104, crossing over road, in *coping stone of abutment;* bronze tablet stamped "1384 A"	1,384.002

	Feet.
Tunnel, in front of station: top of north rail	1,415.2
Harpersville station, 1,250 feet west of, southwest corner of iron-trestle Bridge No. 97, in coping stone of abutment; bronze tablet stamped "1051 A"	1,049.041
Harpersville, in front of station; top of north rail	1,053.7
Nineveh, in front of station; top of north rail	1,033.7
Afton, in front of station; top of north rail	982.0
Afton, 1,050 feet northeast of, northeast corner of iron-girder Bridge No. 90¼, crossing over highway, in coping stone of abutment; bronze tablet stamped "973 A"	972.782

SIDNEY QUADRANGLE.

Bainbridge, 2 miles south of, northeast corner of small cattle-pass opening, in foundation stone; bronze tablet stamped "978 A"	977.676
Bainbridge, in front of station; top of north rail	1,006.2
Bainbridge, 2.75 miles east of, southeast corner of Bridge No. 84, in coping stone of abutment; bronze tablet stamped "989 A"	989.674
Sidney, 0.25 mile west of Delaware and Hudson station, at crossing of Delaware and Hudson and New York, Ontario and Western railroads; top of rail	990.9
Sidney, in front of Delaware and Hudson station; top of south rail	993.1
Unadilla, in front of Delaware and Hudson station; top of south rail	1,025.0
Unadilla, Union school building, foundation wall at left of main entrance; aluminum tablet stamped "1024 A"	1,023.325

ONEONTA QUADRANGLE.

Wells Bridge, 300 feet west of station, northeast corner of highway bridge across Susquehanna River, in coping stone of abutment; bronze tablet stamped "1047 A"	1,046.657
Wells Bridge, in front of Delaware and Hudson station; top of south rail	1,049.5
Otego, in front of Delaware and Hudson station; top of rail	1,063.9
Otego, 1 mile east of, southeast corner of culvert, third step from top; bronze tablet stamped "1051 A"	1,050.145
Oneonta, State Normal School, in face of west pillar at main entrance; alumiunm tablet stamped "1232 A"	1,231.912
Oneonta, in front of Delaware and Hudson station; top of north rail	1,083.9
Oneonta, Delaware and Hudson station; southwest corner of doorsill of door into waiting room and dining hall (door faces track and is east of office window)	1,086.469

DELHI QUADRANGLE.

Colliers, in front of Delaware and Hudson station; top of rail	1,119.3
Colliers, 700 feet east of, bridge No. 54 across Susquehanna River; northeast corner of coping stone of east abutment; bronze tablet stamped "1119 A"	1,118.493
Cooperstown Junction, in front of station; top of rail	1,127.3

COOPERSTOWN QUADRANGLE.

Maryland, 1.9 miles west of, southeast corner of Bridge No. 51 across Schenevus Creek, in parapet wall; bronze tablet stamped "1170 A"	1,16[illegible].850
Maryland, in front of Delaware and Hudson station; top of north rail	1,21[illegible].4
Schenevus, in front of Delaware and Hudson station; top of south rail	1,27[illegible].3
Schenevus, 0.25 mile east of Delaware and Hudson station, southeast corner of bridge across Schenevus Creek, in coping stone of abutment; bronze tablet stamped "1272 A"	1,27[illegible].387
Worcester, 80 feet west of west end of Delaware and Hudson station, foundation of railroad water tank, third course of stone, east side of tank; aluminum tablet stamped "1311 A"	1,31[illegible].16[illegible]

RICHMONDVILLE QUADRANGLE.

Worcester, in front of Delaware and Hudson station; top of north rail	1,30[illegible].4
East Worcester, 0.75 mile west of, north end of center pier of railroad bridge or large culvert; aluminum tablet in capstone stamped "1406 A"	1,40[illegible].20
East Worcester, in front of Delaware and Hudson station; top of north rail	1,43[illegible].5
Richmondville, 0.6 mile west of, northeast corner of Delaware and Hudson Railroad bridge No. 31, in coping stone of east abutment wall; bronze tablet stamped "1224 A"	1,22[illegible].062
Richmondville, in front of Delaware and Hudson station; top of south rail	1,18[illegible].9
Cobleskill, 1 mile west of, south end of culvert at west side of road crossing; chiseled square.	94[illegible].23

SCHOHARIE QUADRANGLE.

Cobleskill, Union school building, stone foundation at northwest corner; bronze tablet stamped "930 A"	929.604

	Feet.
Cobleskill, in front of Delaware and Hudson station; top of north rail	909.1
Barnerville, crossing, on rock 50 feet north of railroad; chiseled square	903.833
Barnerville, crossing, in front of station; top of north rail	906.1
Howe Cave, in front of Delaware and Hudson station; top of south rail	795.4
Howe Cave, 1.2 miles east of, bridge seat at northwest corner of small bridge or open culvert; bronze tablet stamped "731 A"	730.725
Central Bridge, in front of Delaware and Hudson station; top of north rail	621.1
Schoharie Junction, in front of Delaware and Hudson station; top of north rail	598.8
Esperance, 1,250 feet west of Delaware and Hudson station, north end of stone culvert under Delaware and Hudson Railroad, in coping stone; bronze tablet stamped "753 A"	752.440
Esperance in front of Delaware and Hudson station; top of north rail	768.0

BERNE QUADRANGLE.

Delanson, in front of Delaware and Hudson station; top of south rail	812.5

AMSTERDAM QUADRANGLE.

Duanesburg, 1,000 feet west of Delaware and Hudson station, north end of east abutment of bridge; bronze tablet stamped "681 A"	680.822
Duanesburg, in front of Delaware and Hudson station; top of south rail	676.6
Kelleys, at station; top of rail	490.9
Kelleys, 1.75 miles east of, 750 feet east of highway, at east abutment of cattle and wagon pass, in coping stone; bronze tablet stamped "410 A"	409.008
South Schenectady, at road crossing of West Shore and Delaware and Hudson railroads; top of rail	349.1

SCHENECTADY QUADRANGLE.

Schenectady, New York Central and Hudson River Railroad bridge over Erie Canal, northeast corner of coping stone of abutment wall; bronze tablet stamped "242 A"	241.195

SCHENECTADY, ALONG THE ERIE CANAL, TO COHOES.

Schenectady, 4 miles east of, Rexford Feeder Bridge, Erie Canal; coping 1.5 feet from south corner west abutment	217.244
Rexford, 3.5 miles east of; coping stone on south corner of east wall of west Lock No. 20	208.305
Rexford, 3.5 miles east of; top of screw bolt fastening down collar of southwest gate of west Lock No. 20	208.396
Rexford, 6.5 miles east of; top of projection of stone on second course of masonry at east corner of south abutment of second canal bridge below Lock No. 19	190.870

COHOES QUADRANGLE.

Cohoes, 3.5 miles west of, east end of lower Mohawk Aqueduct, southwest corner of parapet wall; chiseled cross inclosed by circle	194.608
Cohoes, on top of wall west side of mill race between Locks Nos. 15 and 16, 6 inches from northeast corner of small brick building between mill race and towpath; chiseled cross	159.404
Cohoes, Lock No. 15, on east wall, south end of west lock; cross cut on second foot-iron clamp, (U. S. Engineer Corps bench mark)	159.890
Cohoes, Lock No. 15, southwest corner of east wall of west lock; top of point of coping	159.810

CHENANGO, DELAWARE, MADISON, ONEIDA, AND OTSEGO COUNTIES.

DEPOSIT, HANCOCK, NEW BERLIN, ONEONTA, ORISKANY, SIDNEY, UTICA, WALTON, WINFIELD, AND SANGERFIELD QUADRANGLES.

The elevations in the following list are the result of a line of precise leveling over the following route. A small circuit was first run in Utica, recovering various bench marks of other level lines, and closed with an error of 0.01 foot in a total distance of 4.0 miles of double-rodded, direct and reverse, simultaneous lines. The main line thence continues south from Lock No. 46 to a connection near Sidney, or 2.7 miles east of Bainbridge, with the precise-level line run in 1899 by Mr. E. L. McNair, topographer, the results of which were published in the Appendix to the Twentieth Annual Report of the Geological Survey, Part I, and are republished in this bulletin as corrected by the 1903 adjustment.

Continuing thence south a final connection was made 0.7 mile north of Hancock to the precise-level line run in 1900 by Mr. C. H. Semper, levelman, the results of which appear in this bulletin. Thus are formed two elementary lines of the precise-level net, 63.6 miles and 43.9 miles, respectively, with a total divergence in each section of only 0.02 foot between the direct and reverse simultaneous lines, though the maximum local divergence amounted to 0.04 foot in a stretch of 5 miles and 0.05 foot in another of 7 miles.

The adjustment of the precise-level net made in the spring of 1903 by the United States Coast and Geodetic Survey, in which these lines became factors, resulted in increasing the elevation by the unadjusted line 0.119 foot at Sidney with respect to Utica, and 0.078 foot at Hancock with respect to Sidney. The elevations here listed result from said adjustment.

A Buff & Berger precise level was used with a 4-inch second vial, and the double-simultaneous method. The leveling was done during part of July, August, and September, 1901, by Mr. D. H. Baldwin, topographer in charge. All standard bench marks are stamped with the letters "ALBANY" in addition to the figures of elevation and year.

UTICA QUADRANGLE.

	Feet.
Utica, Deep Waterways bench mark, about 50 feet north of north bank of Mohawk River and about 830 feet northeast from northeast corner of railroad bridge over Mohawk River, Black River branch of the New York Central and Hudson River Railroad; copper nail in root of elm tree	405.083
Utica, post-office, west side of east of two rear entrances in basement area on building wall; bronze tablet stamped "419 feet"	417.207
Utica, Seneca Street Bridge, southeast corner of lower step, west wing towpath (north) abutment: chiseled square	430.14
Utica, Whitesboro Street Bridge, old bench mark in new position on top of southeast corner of stone platform at base of east stairs, towpath abutment, about 3 feet above towpath; chiseled circle stamped "B. M." on south face	431.56
Utica, Whitesboro Street Bridge (State engineer's B. M. No. 222), southwest corner of stone platform base of west stairs, towpath abutment, 3 feet below towpath; copper bolt	431.637
Utica, Lock No. 46 (State engineer's B. M. No. 223), northeast hollow quoin, towpath lock, between anchors; copper bolt	430.410

UTICA, SOUTH ALONG THE DELAWARE, LACKAWANNA AND WESTERN, THE UNADILLA VALLEY, AND THE NEW YORK, ONTARIO AND WESTERN RAILROADS, TO SIDNEY.

ORISKANY QUADRANGLE.

Utica, Pleasant avenue, Delaware, Lackawanna and Western Railroad crossing; top of east rail	477.8
New Hartford, junction with trolley at station; top of east rail	537.7
Washington Mills, crossing; top of east rail	616.6
Willowvale, crossing; top of east rail	658.1
Chadwick, 0.5 mile north of, 75 feet west of Delaware, Lackawanna and Western Railroad track, brick storehouse of Utica-Willowvale Bleaching Company, in sandstone water table at east end of north wall; aluminum tablet	690.7
Chadwick, crossing at station; top of east rail	721.4
Saquoit, crossing at station; top of east rail	822.4

WINFIELD QUADRANGLE.

Clayville, in front of station; top of east rail	985.4
Richfield Junction, in front of new station; top of east rail, main track	1,176.7
Richfield Junction, 0.36 mile south of, on south end of foundation wall of wooden trestle bent under overhead highway bridge, west side of track, aluminum tablet stamped "1221 ALBANY 1901"	1,221.5
Richfield Junction, 1.15 miles south of, about 250 feet north of red tool house, summit of railroad; top of east rail	1,271.6

SANGERFIELD QUADRANGLE.

Richfield Junction, 2.84 miles south of, at North Bridgewater crossing near old milk station; top of east rail	1,235.9
Bridgewater, in front of station; top of east rail	1,198.1

LINE CONTINUED SOUTH ALONG THE UNADILLA VALLEY RAILWAY.

	Feet.
Leonardsville, at southeast corner of milk station, in face of corner stone of foundation; aluminum tablet stamped "1152 ALBANY 1901"	1,152.551
Leonardsville, at crossing near station; top of east rail	1,148.7
West Edmeston, crossing; top of east rail	1,138.8
West Edmeston, northeast corner of highway bridge, on coping stone of east abutment; chiseled square	1,134.21

NEW BERLIN QUADRANGLE.

West Edmeston, 1.55 miles south of, southwest corner of highway bridge, on coping stone of foundation; chiseled square	1,127.18
Sweets, road crossing near station; top of east rail	1,123.8
South Edmeston, at road crossing; top of east rail	1,111.0
South Edmeston, 0.2 mile east of railroad, northeast corner of highway bridge, on top stone of foundation; aluminum tablet stamped "1110 ALBANY 1901"	1,109.984
New Berlin, New York, Ontario and Western Railway bridge No. 52, near northwest end of center pier, on top of coping stone; aluminum tablet stamped "1089 ALBANY 1901"	1,089.291

LINE CONTINUED SOUTHWEST ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY.

New Berlin, opposite New York, Ontario and Western station; top of southeast rail	1,093.4
New Berlin, 1.01 miles south of, south side of stone-arch highway bridge, on face of keystone; chiseled cross	1,091.32
Sage, crossing near flag station; top of east rail	1,085.1
New Berlin Center, in front of flag station; top of east rail	1,073.6
Davis, crossing; top of east rail	1,074.0
South New Berlin, railroad crossing south of station; top of east rail	1,057.0
South New Berlin, Baptist Church, under front window, north side of entrance, near northwest corner of building, in third course of brick above water table; aluminum tablet stamped "1059 ALBANY 1901"	1,059.667
New Berlin, 1.21 miles south of, southeast corner of railroad bridge, on abutment; chiseled square	1,074.24
Holmesville, in front of station, main track; top of east rail	1,067.8

SIDNEY QUADRANGLE.

Holmesville, 1.77 miles south of, southeast abutment of wooden railroad bridge; chiseled square	1,054.54
White's store, in front of station; top of east rail	1,072.8
Lathams Corners, at north crossing; top of east rail	1,049.9
Rockwells Mills, at crossing near station, main track; top of east rail	1,055.4
Mount Upton, Methodist Church, north side of front (east) entrance, in third course of foundation stone above ground; aluminum tablet stamped "1035 ALBANY 1901"	1,035.710
Mount Upton, in front of station; top of east rail	1,047.2
Mount Upton, 2.38 miles south of, northwest corner of large iron highway bridge over Unadilla River, 150 feet east of track, on coping; chiseled square	1,017.07
Rockdale, in front of station; top of east rail	1,020.18
New Berlin Junction, at highway crossing, on New York, Ontario and Western Railway; top of east rail, main line	1,084.4

LINE CONTINUED SOUTH, ALONG THE MAIN LINE OF THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO SIDNEY, THENCE WEST.

Sidney at junction, grade crossing of Delaware and Hudson and New York, Ontario and Western Railways, top of rail	990.9
Bainbridge, 2.7 miles east of, on coping stone at southwest corner of bridge No. 84, bronze tablet stamped "989 ALBANY 1901"	989.674

SIDNEY, ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, SOUTHEAST TO WALTON, THENCE SOUTHWEST TO HANCOCK.

SIDNEY QUADRANGLE.

South Unadilla, in front of station; top of east rail	1,159.3
Youngs, in front of station; top of north rail	1,238.3
Maywood, in front of station; top of east rail	1,398.5
Maywood (Sidney Center), trestle No. 216, under north side of third trestle tower from east end, in top of old pier, aluminum tablet stamped "1344 ALBANY 1901"	1,344.405

ONEONTA QUADRANGLE.

	Feet.
Franklin station, crossing; top of north rail	1,582.2
Merrickville, at crossing; top of north rail	1,700.0
Northfield, 0.37 mile northwest of, 30 feet south of south end of Zigzag tunnel, vertical face of rock on west side of track about 6 feet above rail; aluminum tablet stamped "1766 ALBANY 1901"	1,766.900
Northfield, 0.37 mile northwest of, at railroad summit, north end of oil house; top of east rail.	1,765.1
Northfield, in front of station; top of northeast rail	1,757.2

WALTON QUADRANGLE.

Northfield, 5.95 miles southeast of, southeast corner of bridge, on foundation stone; chiseled square	1,312.68
Walton, in front of station; top of rail	1,233.4
Walton, southwest corner of North and Gardiner streets, northeast corner of Ogden Free Library, east face of corner of water table; aluminum tablet stamped "1215 ALBANY 1901"	1,216.051
Pine, switch crossing; top of southeast rail	1,201.1
Beerston, at crossing, main track; top of south rail	1,181.3
Rock Rift, 0.5 mile north of, 150 feet south of crossing, on east side of track, 4 feet above rail, on face of ledge; aluminum tablet stamped "1214 ALBANY 1901"	1,214.760
Rock Rift, in front of station; top of east rail	1,226.8

DEPOSIT QUADRANGLE.

Apex, 0.45 mile north of, at railroad summit; top of east rail	1,461.3
Apex, in front of station; top of east rail	1,445.1

HANCOCK QUADRANGLE.

Cadosia, 0.17 mile west of, at west abutment of trestle No. "B 1," on south corner coping stone of parapet wall; aluminum tablet [a] stamped "990 ALBANY 1901"	990.572
Hancock, in front of Erie station, north-bound track; top of north rail	923.7
Hancock, southeast corner of Bridge No. 18, on foundation stone; chiseled square	912.74
Hancock, 0.75 mile north of, southeast corner of large steel Bridge No. 19, top of parapet wall, 6 feet east of rail; bronze tablet stamped "924 ALBANY 1900"	924.721

BROOME, DELAWARE, ORANGE, SULLIVAN, AND ULSTER COUNTIES.

BINGHAMTON, DEPOSIT, GOSHEN, HANCOCK, NARROWSBURG, NEWBURG, NINEVEH, LONG EDDY, POUGHKEEPSIE, AND PORT JERVIS QUADRANGLES.

The elevations in the following list are the result of a line of precise levels run from Binghamton to Poughkeepsie. The two sections of this line, Binghamton to Hancock and Hancock to Poughkeepsie, form links in the net of precise leveling 49 and 138 miles, respectively, in length. The result of the 1903 adjustment was to increase the elevation at Hancock with respect to Binghamton 0.042 foot and to increase the elevation at Poughkeepsie with respect to Hancock 0.423 foot. The double-simultaneous method was employed, with a Buff & Berger precise level and an 8-second vial. The Pennsylvania portions of this line will be published under Pennsylvania.

The leveling was done during June, July, and August, 1900, by Mr. C. H. Semper, levelman. The standard bench marks are referred to the Albany datum and are stamped with the letters "ALBANY" in addition to the figures of elevation.

BINGHAMTON, ALONG ERIE RAILROAD VIA HANCOCK, TO MIDDLETOWN.

BINGHAMTON QUADRANGLE.

	Feet.
Binghamton, Broome County court-house, west end of, at left of basement entrance from Collier street; aluminum tablet stamped "867 A"	866.056
Langdon, 1,000 feet north of station, top of south abutment west side of creek culvert; bronze tablet stamped "860 ALBANY 1900"	860.468
Langdon, in front of station; top of rail	864.4
Kirkwood, in front of station, north-bound track; top of rail	871.6

[a] From this point via Main street downhill to Erie station, thence northwest to tablet.

	Feet.
Kirkwood, 0.5 mile south of, retaining wall of signal tower, in northwest corner, 7 feet northwest of tower house; railroad spike in top of timber of retaining wall	872.52
Riverside, in front of station; top of rail	869.8

NINEVEH QUADRANGLE.

Gulf Summit, at railroad crossing near station, north-bound track; top of rail	1,363.5
Oquaga, at railroad crossing by station, north-bound track; top of rail	1,153.6

DEPOSIT QUADRANGLE.

Deposit, 1 mile west of, iron bridge over river, south wing of east abutment; bronze tablet marked "1026 ALBANY 1900"	1,026.543
Deposit, in front of station, north-bound track; top of rail	1,003.7
Deposit, 4.4 miles south of, north abutment of iron bridge, west side, top of bridge seat; bronze tablet stamped "978 ALBANY 1900"	978.972
Hales Eddy, in front of station, north-bound track; top of rail	973.3

HANCOCK QUADRANGLE.

Hancock, 0.7 mile northwest of, large steel bridge, on top of parapet wall, 6 feet east of rail; bronze tablet stamped "924 ALBANY 1900"	924.721
Hancock, in front of station, north-bound track; top of rail	923.7
Stockport, in front of station, north-bound track; top of rail	891.9
Stockport, 1.1 miles south of, Bridge No. 17, west abutment, south side, on top of second step; bronze tablet stamped "882 ALBANY 1900"	882.904

LONG EDDY QUADRANGLE.

Lordville, opposite milepost "J. C. 153 B. 271", north-bound track; top of rail	869.3
Lordville, at railroad station, suspension bridge over Delaware River, in face of north abutment; bronze tablet stamped "865 ALBANY 1900"	865.915
Long Eddy, 400 feet north of station, girder bridge, east side of south abutment, in top of bridge seat; bronze tablet stamped "834 ALBANY 1900"	835.195
Long Eddy, in front of station, north-bound track; top of rail	836.7
Hankins, in front of station, north-bound track; top of rail	807.5
Hankins, 1 mile south of, 100 feet west of milepost "J C 141", south side of railroad, in west abutment of small bridge over creek; aluminum tablet stamped "801 ALBANY 1900"	802.015
Callicoon, in front of station, north-bound track; top of rail	782.3
Callicoon, 900 feet south of station, railroad girder bridge over Delaware River, top of north abutment, east side; bronze tablet stamped "780 ALBANY 1900"	780.683

NARROWSBURG QUADRANGLE.

Cohecton, 100 feet north of station, railroad bridge over highway, top of north abutment, east side; bronze tablet stamped "746 ALBANY 1900"	746.777
Cohecton, in front of station, north-bound track; top of rail	749.0
Narrowsburg, in front of station, north-bound track; top of rail	715.6
Narrowsburg, 600 feet west of station, 100 feet west of east end of rock cut, north side; bronze tablet stamped "718 ALBANY 1900"	718.717
Tusten, in front of station, north-bound track; top of rail	684.6

PORT JERVIS QUADRANGLE.

Sparrowbush, in front of station, north-bound track; top of rail	473.4
Port Jervis, Erie Railroad bridge over East Main street, top of south abutment, west side, first step below bridge seat; bronze tablet stamped "456 ALBANY 1900"	457.077
Guymard, 600 feet north of station, railroad culvert, top of north abutment, west side; bronze tablet stamped "780 ALBANY 1900"	780.914
Otisville, 500 feet west of station, small railroad bridge over private road, west abutment, north side, top of bridge seat; bronze tablet stamped "861 ALBANY 1900"	862.219
Otisville, in front of station, west-bound track; top of rail	857.5

GOSHEN QUADRANGLE.

Howells, in front of station, west-bound track; top of rail	688.2
Middletown, in front of station, west-bound track; top of rail	562.1
Middletown, Clemson Brothers' saw shop, in front face of brickwork, left of office entrance; bronze tablet stamped "558 ALBANY 1900"	558.919

MIDDLETOWN, ALONG NEW YORK, ONTARIO AND WESTERN RAILWAY, TO CAMPBELL HALL.

	Feet.
Mechanicstown, in front of station; top of rail	482.0
Crystal Run, in front of station; top of rail	419.0
Stony Ford, in front of station; top of rail	372.4
Campbell Hall, Campbell Hall Hotel, south face of brickwork; bronze tablet stamped "408 ALBANY 1900"	409.078

CAMPBELL HALL, NORTH ALONG WALLKILL VALLEY RAILROAD, TO WALDEN, THENCE TO EAST WALDEN, AND ALONG CENTRAL NEW ENGLAND RAILWAY TO POUGHKEEPSIE.

NEWBURG QUADRANGLE.

Neeleytown, in front of station; top of rail	376.5
Beaver Dam, in front of station; top of rail	403.7
Walden, National Bank, southwest corner; aluminum tablet stamped "376"	375.136
St. Elmo, in front of station; top of rail	435.2
Modena, in front of station; top of rail	465.8
Moubray, in front of station; top of rail	454.2
Elting, in front of station; top of rail	421.0
Clintondale, in front of station; top of rail	386.3
Lloyd, street railroad in front of station; top of rail	353.6
Lloyd, Centerville Hotel, southeast corner; bronze tablet stamped "359"	358.177

POUGHKEEPSIE QUADRANGLE.

Poughkeepsie, corner of Main and Washington streets; in front face of city hall; aluminum tablet stamped "173 A"	172.991

CHEMUNG COUNTY.

ELMIRA QUADRANGLE.

The following elevations are a portion of the results of a line of precise levels run in 1899 by Mr. C. H. Semper, levelman, south over the Northern Central Railway to Williamsport, Pa. The remainder of results and a fuller description of this line will be published under Pennsylvania.

ELMIRA, SOUTH ALONG THE NORTHERN CENTRAL RAILWAY, TO WILLIAMSPORT, PA.

	Feet.
Southport, in front of station; top of east rail	854.3
Elmira, 7 miles south of, creek and cattle-pass culvert, west side of railroad, in wall; bronze tablet stamped "1067 HARRISBURG 1899"	1,068.338
State boundary (New York-Pennsylvania) line post, opposite; top of rail	1,096.7

ALLEGANY, LIVINGSTON, MONROE, AND STEUBEN COUNTIES.

CALEDONIA, CANASERAGA, HONEOYE, HORNELLSVILLE, NUNDA, AND ROCHESTER QUADRANGLES.

The elevations in the following list are the result of a line of precise leveling, based upon the Rochester datum connecting the Lake Survey gage bench mark at Charlotte with the State engineer's level line of 1901 at Rochester and continued south to a final connection at Hornellsville with the precise-level line run by Mr. E. L. McNair, topographer, in 1899.

This line forms an element in the precise-level net and a factor in the 1903 adjustment of the same made by the United States Coast and Geodetic Survey. The amount of correction this line received by this adjustment is 0.084 foot in a total distance of 88.4 miles, the original elevation at Hornellsville by this line being lowered with respect to Charlotte. The total divergence of the direct and reverse, simultaneous rodded lines is 0.096 foot.

The double-simultaneous method was employed, with a Buff & Berger precise level and a 4-second vial. The leveling was done during part of September, 1901, and part of

August and September, 1902, by Mr. D. H. Baldwin, topographer in charge. All standard bench marks dependent on this datum are stamped with the letters "ROCHESTER" in addition to the figures of elevation and year.

CHARLOTTE, SOUTH ALONG THE NEW YORK CENTRAL, THE PENNSYLVANIA, THE LEHIGH VALLEY, THE PITTSBURG, SHAWMUT AND NORTHERN, AND THE ERIE RAILROADS, VIA ROCHESTER AND NUNDA, TO HORNELLSVILLE.

ROCHESTER QUADRANGLE.

	Feet.
Charlotte, 0.22 mile northeast of New York Central station, old light-house, upper side of water table at south-southeast angle, east of the south window; chiseled cross (U. S. L. S. B. M.)	283.168
Barnard, crossing; top of northwest rail	401.4
Little Ridge crossing; top of west rail	432.1
Rochester, Ridgeway avenue, or Big road crossing; top of west rail	472.1
Rochester, highway bridge No. 87, over barge canal, south abutment, east wing; chiseled square on lowest step	512.22
Rochester (State engineer's bench mark No. 457), Rowe Street Bridge No. 86, near towpath, on foundation under east tower; chiseled square	512.64
Rochester, Rowe Street Bridge (Buffalo, Rochester and Pittsburg Railway), southwest corner, on parapet stone; chiseled square	527.10
Rochester, Buffalo, Rochester and Pittsburg Railway bridge over Niagara Falls Railroad, southwest corner, on parapet wall; chiseled square	548.81
Rochester, Buffalo, Rochester and Pittsburg Railway bridge over New York Central Railroad; top of west rail	561.5
Rochester, grade crossing of Buffalo, Rochester and Pittsburg main line over Pennsylvania (branch) Railroad; top of rail	543.4

LINE CONTINUED SOUTH ALONG THE PENNSYLVANIA RAILROAD.

Rochester, 0.22 mile south of, Buffalo, Rochester and Pittsburg Railway crossing, west of track, near north end of stone culvert; chiseled square	538.32
Genesee Junction, West Shore Railroad bridge, northeast corner, near northwest corner of parapet stone; chiseled square	524.75
Genesee Junction, in front of station; top of east rail	526.0
Genesee Junction, 1.49 miles south of, southeast corner of small bridge over old canal, coping of foundation wall; chiseled square	525.90
Whites, road crossing, near flag station; top of east rail	527.1
Whites, 0.72 mile south of, old lock, west side wall, south quoin between anchors; chiseled square	530.93
Severance, in front of flag station; top of east rail	532.6
Severance, 640 feet south of, northwest corner of bridge over canal, on coping stone; chiseled square	531.38
Severance, 2.23 miles south of, northeast corner of highway bridge over canal, on coping stone; chiseled square	534.53
Scottsville, 800 feet north of station, south side of creek overflow dam, on top of stone pier; bronze tablet stamped "537 ROCHESTER 1902"	535.447
Scottsville, in front of station, main track; top of west rail	538.4

HONEOYE QUADRANGLE.

Scottsville, 1.75 miles south of, southwest corner of culvert, on coping stone; chiseled square	540.30
Honeoye Junction, in front of flag station; top of east rail	537.3
Honeoye Junction, Lehigh Valley Railroad bridge No. 34, northeast corner, near corner of foundation coping stone; chiseled square	553.584

LINE CONTINUED EAST ALONG LEHIGH VALLEY RAILROAD.

Genesee Valley Junction, grade crossing of Erie and Lehigh Valley railroads; top of rail	538.8

CALEDONIA QUADRANGLE.

LINE CONTINUED ALONG THE ERIE RAILROAD SOUTHWEST TO AVON, THENCE ALONG THE PENNSYLVANIA RAILROAD.

Avon, near Pennsylvania Railroad station, road crossing; top of east rail	543.5
Fowlerville, 1.42 miles north of, remains of old canal lock, west wall, near center of top stone; chiseled square	551.92

	Feet.
Fowlerville, in front of station; top of east rail	561.2
York, in front of station; top of east rail	561.3
York, 1.02 miles south of, east side of track, on coping stone of culvert; chiseled square	555.76
Piffard, 660 feet north of, west side of track, east side wall of drain from salt works, on coping stone; chiseled square	564.96
Piffard, in front of station; top of east rail	569.0
Piffard, 1.91 miles south of, east side of track, southeast corner of large culvert wall, on coping stone; chiseled square	566.58
Cuylerville, in front of station; top of east rail	569.9
Cuylerville, 0.53 mile south of, northwest corner of Bridge No. 5, on northwest corner of parapet wall; chiseled square	569.29
Delaware, Lackawanna and Western Junction, grade crossing; top of east rail	586.8

NUNDA QUADRANGLE.

Mount Morris, 2,200 feet east of Delaware, Lackawanna and Western station, at northwest corner of railroad bridge, on coping stone; aluminum tablet stamped "575 ROCHESTER 1901"	574.084
Mount Morris, 0.52 mile north of Erie Railroad station, grade crossing of Delaware, Lackawanna and Western; top of rail	574.2
Mount Morris, in front of Erie station; top of west rail	597.4
Mount Morris, 0.48 mile south of Erie Railroad station, southeast corner of Pennsylvania railroad bridge, near northeast corner of parapet wall; chiseled square	603.72
Sonyea, 0.3 mile north of, southwest corner of girder bridge over highway, top of parapet wall; chiseled square	611.56
Sonyea, in front of station; top of east rail	623.5
Sonyea, 0.54 mile south of, center of Bridge No. 12 over Keshaqua Creek; top of east rail	630.6
Sonyea, 2.38 miles south of, southeast corner of Bridge No. 13, near northeast corner of parapet wall; chiseled square	707.58
Tuscarora, 0.61 mile north of, southeast corner of Bridge No. 15, northeast corner of parapet wall; chiseled square	748.82
Tuscarora, in front of station; top of east rail	767.1
Tuscarora, 1,100 feet south of, southeast corner of bridge, top of parapet wall; bronze tablet marked "773 ROCHESTER 1902"	773.302
Nunda Junction, in front of station; top of east rail, Swains branch	868.7
Nunda, in front of station; top of west rail	941.0
Nunda, Fireman's Hall, front face, 1 foot from northwest corner, in water table; aluminum tablet stamped "944 ROCHESTER 1902"	944.345

LINE CONTINUED ALONG THE PITTSBURG, SHAWMUT AND NORTHERN RAILROAD.

Nunda, 4.27 miles southeast of, 60 feet south of crossing, west side of track, on coping stone of box drain; chiseled square	1,253.96
Ross crossing, 1.40 miles northwest of, small wooden bridge near farm crossing; top of east rail	1,290.5

LINE CONTINUED ALONG ERIE RAILROAD.

Ross crossing, 200 feet southeast of, between tracks, north side of open culvert, on coping stone; chiseled square	1,317.95

CANASERAGA QUADRANGLE.

Swains, 1.7 miles north of, southeast corner of steel-girder bridge over small stream, on parapet wall; chiseled square	1,305.38
Swains, north of the Pittsburg, Shawmut and Northern Railroad station, near southwest corner of highway bridge, south of railroad, in west wing wall, on large flat stone; chiseled square	1,298.58
Swains, 200 feet south of Erie railroad station, small Union Church, northwest corner of, in foundation wall; aluminum tablet stamped "1316 ROCHESTER 1902"	1,316.658
Swains, in front of Erie station; top of north rail	1,307.5
Swains, 0.4 mile southeast of, northwest corner of Bridge No. 9, on coping stone of foundation; chiseled square	1,297.10
Swains, 1.79 miles southeast of, northeast corner of Bridge No. 8, on parapet wall; chiseled square	1,275.69
Garwood, in front of station; top of south rail, north-bound track	1,274.9
Canaseraga, 0.2 mile northwest of, northeast corner of Bridge No. 6¼, on foundation stone; chiseled square	1,260.33

	Feet.
Canaseraga, in front of station, west-bound track; top of south rail	1,257.0
Canaseraga, Kingston Hotel, southwest corner, in water table; aluminum tablet stamped "1253 ROCHESTER 1902"	1,252.973

HORNELLSVILLE QUADRANGLE.

Burns, in front of station; top of northeast rail	1,196.2
Burns, 0.4 mile southeast of, north side of track, on east wall of open culvert; chiseled square.	1,190.10
Arkport, in front of station; top of north rail	1,191.9
Arkport, Methodist Protestant Church, southeast corner, in foundation stone; aluminum tablet stamped "1188 ROCHESTER 1902"	1,188.284
Arkport, 1.91 miles south of, southeast corner of Bridge No. 4, on wing wall; chiseled square.	1,169.0
Hornellsville, 0.66 mile north of station, southeast corner of Bridge No. 1, on foundation stone; chiseled square	1,169.04
Hornellsville, 0.7 mile east of station, northeast corner of railroad bridge, on foundation wall; aluminum tablet stamped "1141 D"	1,142.481

CATTARAUGUS COUNTY.

REDHOUSE AND SALAMANCA QUADRANGLES.

The elevations in the following list are the New York portion of the result of two independent double-simultaneous lines of precise leveling run in opposite directions between Salamanca, N. Y., and Irvineton, Pa.

The total divergence between the two lines was 0.043 foot, and the divergence in the rerun line of 1902 alone was 0.011 foot. The total correction to the mean line by the latest adjustment is 0.128 foot in the total distance of 48.8 miles, increasing the elevation at Irvineton with respect to Salamanca, the correction to the 1902 line alone being 0.085 foot. A Buff & Berger precise level was employed in each case, though with an 8-second vial in first line and a 4-second vial in later line. The leveling on the forward line was done in 1899 by Mr. E. L. McNair, topographer, and on the backward line in 1902 by Mr. D. H. Baldwin, topographer. The standard bench marks are referred to the Dunkirk datum and are stamped with the letters "DUNKIRK" in addition to the figures of elevation and year 1899.

SALAMANCA, SOUTHWEST ALONG THE PENNSYLVANIA RAILROAD, TO STATE LINE.

SALAMANCA QUADRANGLE.

	Feet.
Salamanca, Union High School building, Maple street, at right of entrance, in water table; aluminum tablet stamped "1391 DUNKIRK 1899"	1,391.485

REDHOUSE QUADRANGLE.

Shongo, in front of station; top of north rail	1,372.0
Redhouse, in front of station, main track; top of south rail	1,345.9
Redhouse, 0.56 mile southwest of, southeast corner of Bridge No. 126, on foundation coping stone; aluminum tablet stamped "1340 DUNKIRK 1899"	1,340.904
Cold Spring, in front of signboard; top of south rail	1,327.5
Quaker Bridge, in front of station; top of rail	1,329.4
Quaker Bridge, 1.03 miles southwest of, northeast corner of steel-truss bridge, on foundation coping stone; aluminum tablet stamped "1316 DUNKIRK 1899"	1,317.298
Wolf Run, in front of station; top of south rail	1,328.9
Wolf Run, 0.10 mile west of, southeast corner of Bridge No. 121, on parapet of coping stone; chiseled square	1,327.018
Onoville, in front of station; top of west rail	1,306.6
State line, opposite boundary post; top of east rail	1,295.2

CHAUTAUQUA AND ERIE COUNTIES.

BUFFALO, DUNKIRK, EDEN, AND SILVER CREEK QUADRANGLES.

The elevations in the following list are the result of a line of precise levels connecting army engineers' bench marks at Buffalo and Dunkirk which were formerly established from lake gaging. This line is an element in the precise-level net and became a factor in the adjustment made by the United States Coast and Geodetic Survey in the spring of 1903. In accord with this adjustment a correction of 0.217 foot has been distributed proportional to the distance throughout this line to the unadjusted results, raising the elevation at Dunkirk 0.217 foot with respect to Buffalo. The unadjusted results close low 0.034 foot at Dunkirk upon the latest unadjusted water levels from figures in part given by the War Department corrected to a common elevation at Buffalo. The water-level connection was derived by comparisons made between Buffalo and Erie and between Erie and Dunkirk. The elevation at Dunkirk, upon the old army engineers' datum, was obtained from a local office several years ago and no new records were obtainable, but the relative heights of the Buffalo and Erie bench marks have been more correctly determined by addition of later gage records.

The water leveling to the Dunkirk bench mark has not entered as a factor in the adjustment, since its weight was in doubt; there has thus been 0.184 foot correction made to the water leveling between Buffalo and Dunkirk by the adjustment.

The double-simultaneous method was employed with a Buff & Berger precise level and a 4-second vial. The total length of this double-rodded line is 40.87 miles, and the total divergence, 0.101 foot. The leveling was done during part of July and August, 1902, by Mr. D. H. Baldwin, topographer in charge. All standard bench marks dependent on this datum are stamped with the letters "ROCHESTER" in addition to the figures of elevation and year.

BUFFALO, ALONG THE LAKE SHORE AND MICHIGAN SOUTHERN RAILWAY, TO DUNKIRK.

BUFFALO QUADRANGLE.

	Feet.
Buffalo (United States Engineers' bench mark and State Canal bench mark No. 553), South United States Pier Light House, upper surface of plinth; east angle stamped by chiseling in stone so as to leave a rounded point	590.099
Buffalo, Michigan Street Bridge over Buffalo Creek; surface of floor	587.0
Buffalo, Lehigh Valley Railroad bench mark, northwest corner of bridge over Ohio Slip; in top of foundation stone; iron bolt	586.228
Buffalo, northwest of New York Central switch tower, 24 feet from old stone milepost, 10 feet west of track; top of rail driven vertically in ground	589.591
Buffalo, grade crossing of Erie Railroad, four tracks; top of rail	585.4
Buffalo, southeast corner of three-span, iron-truss bridge, overhead crossing of the Delaware, Lackawanna and Western Railroad, on south corner of fourteenth step from top of wing wall about level with track; chiseled square	585.66
Buffalo (railroad bench mark), northwest corner two-span, steel-truss Bridge No. 267 over Buffalo River, southwest corner of parapet wall; chiseled circle	591.46
West Seneca, 0.58 miles north of, end of trestle and two-span bridge overhead crossing, at north end of stone pier about 4 feet above main track, on coping stone; chiseled square	589.16
West Seneca, in front of station; top of rail	589.9
West Seneca, 1.04 miles south of (New York Central Railroad bench mark), 20 feet south of survey station 606+50, 400 feet south of switch tower; top of rail driven vertically in ground.	591.27
Athol Springs, in front of station; top of rail	625.0
Athol Springs, 0.76 mile south of, milepost "B 11" north face, 6 feet above ground; chiseled square	640.54
Athol Springs, 0.91 mile south of, southeast corner of stone-arch culvert bridge, in south face of coping stone; bronze tablet stamped "631 ROCHESTER 1902"	631.110
Athol Springs, 1.1 miles south of, road crossing to "Hamburg-on-the-Lake;" top of east rail	635.6

EDEN QUADRANGLE.

Athol Springs, 1.79 miles south of, near Hamburg station on Pennsylvania Railroad, road crossing on Lake Shore and Michigan Southern Railway; top of rail	651.3

	Feet.
Lake View, 1.99 miles north of, west end of box culvert; northeast corner of coping stone, chiseled square	665.55
Lake View, in front of station; top of rail	708.8
North Evans, in front of station; top of rail	697.5
Derby, 1.29 miles north of, 200 feet east of Lake Shore and Michigan Southern track, southeast corner of highway bridge, crossing Pennsylvania Railroad, in west face of concrete wing wall 2 feet above ground; bronze tablet stamped "724 ROCHESTER 1902"	723.807
Derby, in front of station; top of rail	704.6
Derby, 1.27 miles south of trestle No. 236, southwest corner, near northwest corner of coping stone; chiseled square	681.08

SILVER CREEK QUADRANGLE.

Angola, 1.69 miles northeast of, northeast corner of trestle over cattle pass, 1 foot above track, on coping stone of wing wall; chiseled square	677.16
Angola, 0.51 mile northeast of, southwest corner of truss and stone-arch Bridge No. 228, near northwest corner of coping stone; chiseled square	680.06
Angola, in front of station; top of rail	690.0
Farnham, southeast corner of Bridge No. 220, in east face of parapet coping stone; bronze tablet stamped "633 ROCHESTER 1902"	632.956
Farnham, in front of station; top of rail	632.3
Farnham, 1.21 miles southwest of, northeast corner of culvert 218, on coping stone; chiseled square	610.15
Irving, in front of station; top of rail	601.7
Silver Creek, southeast corner of Bridge No. 207 over Dunkirk street, near east corner of parapet wall; chiseled square	622.10
Silver Creek, in front of station; top of rail	625.5
Silver Creek, 1.58 miles southwest of, southeast corner of Bridge No. 204 (A52), near southeast corner of parapet stone; chiseled square	628.02

DUNKIRK QUADRANGLE.

Waites crossing, nearly opposite flag station; top of east rail	625.4
Waites crossing, 0.70 mile south of, southeast corner of cattle pass Bridge No. 195, at east corner of parapet stone; chiseled square	624.10
Dunkirk, in front of Lake Shore and Michigan Southern railway station; top of rail	598.9
Dunkirk, St. Mary's Home and School, Washington avenue, between Third and Fourth streets, in water table 20 feet from northeast corner; aluminum tablet stamped "598 DUNKIRK 1899"	598.936

PRIMARY LEVELING.

NASSAU, QUEENS, AND SUFFOLK COUNTIES.

BABYLON, HEMPSTEAD, MORICHES, NEW YORK, NORTHPORT, OYSTER BAY, RIVERHEAD, AND SETAUKET QUADRANGLES.

The elevations in the following list are based upon army engineers' bench mark "+18.0555" cut on the face of the retaining wall of Long Dock, in the military post grounds at Willets Point, and corrected also in agreement with United States Coast and Geodetic Survey elevation at Patchogue.

The elevation of this is accepted as 14.135 feet above mean sea level, as obtained from tidal-gage observations made by the Coast and Geodetic Survey and the Army Engineer Corps at Willets Point. The elevations listed on the Hempstead and Oyster Bay quadrangles are republished for completeness without correction from the Nineteenth Annual Report of the United States Geological Survey, pp. 215–217.

The leveling on the Hempstead and Oyster Bay quadrangles was done in 1897 under the direction of Mr. E. B. Clark, topographer, by Mr. Clark Brown, levelman; that on the Northport and Babylon quadrangles was done in 1901 under the direction of Mr. Glenn S. Smith, topographer, by Mr. C. H. Semper, levelman; that on the Setauket quadrangle was done in 1902 under the direction of Mr. Geo. H. Guerdrum, topographer, by Mr. Alfred P. Meade, jr.; and that on the Moriches and Riverhead quadrangles was done in 1903 under the direction of Mr. J. M. Whitman, topographer, by Mr. Geo. Seidel, levelman. All standard bench marks dependent on this datum are stamped with the letters referring to "WILLETS PT." in addition to the figures of elevation.

NEW YORK QUADRANGLE.

WILLETS POINT, SOUTH VIA BAYSIDE TO QUEENS, THENCE EAST TO MINEOLA.

	Feet.
Willets Point, military post grounds, long dock; face of retaining wall under coal shed, marked "+18.0555" with chisel	14.135

HEMPSTEAD QUADRANGLE.

Creedmoor schoolhouse, northwest corner of Madison avenue and Pine street, 15 feet from south line of lot and 2 feet from front line; iron post stamped "85 W. P."	85.163

MINEOLA, SOUTHEAST VIA GARDEN CITY AND HEMPSTEAD, TO MERRICK.

Mineola, in coping west end north pier of railroad water tank; bronze tablet stamped "105 W. P."	105.291
Merrick, southwest corner of railroad crossing, about 15 feet from center of track, 5 feet west of line of street, 15 feet north of corner of stone; iron post stamped "19 W. P."	18.834

MERRICK, WEST VIA FREEPORT TO ROCKVILLE, THENCE NORTH TO MINEOLA.

Rockville Center, northeast corner of Village avenue and Observer street, in stone water table of brick building north of door between pilaster and window; bronze tablet stamped "26 W. P."	26.378

OYSTER BAY QUADRANGLE.

MINEOLA, NORTHEAST VIA JERICHO, TO EAST NORWICH.

Jericho, opposite hotel; top of marble highway monument in triangle of roads	194.08
Jericho, Jericho pike at forks of road to Oyster Bay and Syosset, retaining wall east of road, 15 feet from driveway to residence; bronze tablet stamped "218 W. P."	218.160

EAST NORWICH, WEST VIA ROSLYN TO BAYSIDE.

Roslyn, west side of south front of upper basin on public fountain; bronze tablet stamped "37 W. P."	37.452

NORTHPORT QUADRANGLE.

JERICHO, NORTHEAST ALONG HIGHWAY AND RAILROAD, TO EAST NORTHPORT.

Syosset, road crossing at station; top of rail	205.9
Syosset, 1.9 miles east of, overhead railroad bridge, south end of east abutment; top of bridge seat, chiseled square	161.38
Cold Spring, at road crossing at station; top of rail	129.8
Huntington, northwest corner of Central Presbyterian Church on Main street, front face; bronze tablet stamped "52 WILLETS PT. 1901"	52.193

EAST NORTHPORT, SOUTH ALONG HIGHWAY VIA COMMACK, TO BRENTWOOD, THENCE WEST ALONG RAILROAD TO DEERPARK.

East Northport, 0.2 mile south of station, south corner of schoolhouse, front face; bronze tablet stamped "229 WILLETS PT. 1901"	229.433
Commack, near post-office, northeast angle of crossroads; large flat rock	131.57
Brentwood, 200 feet west of station, road crossing; top of rail	86.0
Brentwood, southeast corner of Presbyterian Church 500 feet south of station, front face; bronze tablet stamped "87 WILLETS PT. 1901"	87.401
Edgewood, 100 feet south of station, at road crossing; top of rail	77.5
Deerpark, 800 feet south of road crossing, in front face of south corner of church; bronze tablet stamped "72 WILLETS PT. 1901"	72.071

EAST NORTHPORT, EAST ALONG THE LONG ISLAND RAILROAD, TO KINGS PARK.

East Northport, 2 miles east of, Bread and Cheese Hollow Bridge across ravine; west end; top of rail	147.9
Kings Park, road crossing; top of high rail	171.8

BABYLON QUADRANGLE.

DEERPARK, SOUTH ALONG HIGHWAY, TO BABYLON.

Babylon, Deerpark avenue crossing; top of rail	13.0
Babylon, Methodist Episcopal Church on Deerpark avenue, front face near north end; bronze tablet stamped "17 WILLETS PT. 1901"	16.677

BABYLON, NORTHWEST ALONG RAILROAD VIA FARMINGDALE, TO JERICHO.

	Feet.
Farmingdale, at main street crossing; top of rail	71
Farmingdale, front face of Catholic Church on Cherry street, east end; bronze tablet stamped "74 WILLETS PT. 1901"	73.550

SETAUKET QUADRANGLE.

KINGS PARK, EAST ALONG THE LONG ISLAND RAILROAD TO PORT JEFFERSON, THENCE ALONG HIGHWAYS SOUTH TO HOLTSVILLE, THENCE WEST TO BRENTWOOD.

Smithtown, southwest wing wall of big railroad bridge, cement pier, west end of bridge; bronze tablet stamped "26 WILLETS"	25.740
Stony Brook, 300 feet east of station, 30 feet north of track, at foot of triple tree; top of big rock, chiseled square	111.26
Setauket, 100 feet west of station, north side of east abutment of railroad bridge; top of first step below coping	80.70
Port Jefferson, at east end of station, railroad crossing; top of north rail	191.7
Port Jefferson, railroad crossing, 6 feet north of track, west side of highway crossing, 25 feet east of freight station; iron post stamped "192 WILLETS"	192.078
Selden, northwest corner of Methodist Church, in brick foundation; bronze tablet stamped "108 WILLETS"	107.61
Ruland Hill, Coast and Geodetic Survey triangulation station, 1.9 miles south of Selden; top of east stone reference post	332.86
Holtsville, north face of brick house south of track, 150 feet east of station; bronze tablet stamped "104 WILLETS"	103.728
Ronkonkoma, east end of station, in grass plot, south of highway, north of track; iron post stamped "108 WILLETS"	108.300

POINT 1.4 MILES EAST OF BRENTWOOD, NORTH ALONG HIGHWAY, TO SMITHTOWN BRANCH.

Hauppauge, in front of post-office, road crossing; top of big milestone	59.06
Smithtown Branch, railroad crossing, south side of track, east side of highway, west end of station; spike in telegraph pole	63.64

PATCHOGUE, NORTH TO HOLTSVILLE.

Patchogue, Coast and Geodetic Survey gage bench mark No. 1, about 80 yards from shore, west of Ocean avenue; 4 spikes in twin cedar tree (elevation given by Coast Survey)	5.70
Patchogue, railroad freight station, north side of track, in northeast corner of brick wall; aluminum tablet stamped "15 WILLETS PT."	15.540

MORICHES QUADRANGLE.

SELDEN, ALONG PUBLIC ROAD EAST VIA MIDDLE ISLAND, TO RIVERHEAD.

Middle Island post-office, 0.4 mile east of; west of Artist Lake, 20 feet south of center of highway, 175 feet west of road to Woodville, in rock; bronze tablet stamped "57 WILLETS PT."	57.065
Manorville, 3.5 miles north of, 1.2 miles east of Horn Tavern, south of road, about 800 feet east of Henry Hallock's farmhouse, at road running south; iron post stamped "83 WILLETS PT."	83.454

EASTPORT, WEST ALONG THE LONG ISLAND RAILROAD, TO PATCHOGUE.

Center Moriches, pavement, west end of platform; rock	29.99
South Haven, Presbyterian Church, northwest corner of foundation wall; bronze tablet stamped "17 WILLETS PT."	17.654

RIVERHEAD QUADRANGLE.

RIVERHEAD, SOUTHWEST TO EASTPORT.

Riverhead, northeast corner of court-house, in brick foundation; aluminum tablet stamped "28 WILLETS PT."	27.862
Eastport, 225 feet north of railroad station, south side of road to Speonk; iron post stamped "29 WILLETS PT."	29.780

ESSEX, FRANKLIN, AND HAMILTON COUNTIES.

LAKE PLACID, SANTANONI, SARANAC, AND ST. REGIS QUADRANGLES.

The elevations in the following list are based upon a bronze tablet in top of south end of east abutment of Grand Trunk Railway bridge over Salmon River, 600 feet west of Fort Covington station, stamped "167 ALBANY 1900." The elevation of this is accepted as 166.453 feet above mean sea level, and is determined from a bench mark of the United States Board of Engineers on Deep Waterways, on the same abutment, the elevation of which is determined to be 1.017 feet lower than given by the Board, in accordance with the 1903 adjustment. For additional elevations on St. Regis quadrangle see list on the precise-level line from Fort Covington to Tupper Lake Junction.

The leveling was done under the direction of Mr. Glenn S. Smith, topographer, as follows: On the Santanoni and Lake Placid and part of Saranac and St. Regis quadrangles in 1901 by Mr. C. H. Semper, levelman; the remainder on St. Regis quadrangle was done in 1902 by Mr. George Seidel; and the remainder on Saranac quadrangle in 1902 by Messrs. Seidel and A. P. Meade, jr., levelmen. All standard bench marks dependent on this datum are stamped "FT. COVINGTON" in addition to the figures of elevation.

SANTANONI QUADRANGLE.

AXTON, VIA AMPERSAND AND PRESTON PONDS, TO AVERYVILLE.

	Feet.
Axton, 6.5 miles east of, 0.7 mile southwest of Ampersand Lake, 450 feet west of old lumber camp, 10 feet south of road, on large rock 20 by 15 feet; bronze tablet stamped "1917 FT. COVINGTON 1901"	1,917.438
Averyville, 550 feet south of school, 20 feet west of west margin of road, in large bowlder 8 feet square; bronze tablet stamped "2069 FT. COVINGTON 1901"	2,069.446

AVERYVILLE, VIA LAKE PLACID AND ALONG THE CHATEAUGAY RAILROAD, TO LAKE PLACID.

Averyville, 1.9 miles northeast of, iron bridge over river, west side of north abutment, on top of bridge seat; chiseled square	1,817.88

NEWCOMB, NORTH ALONG ROAD TOWARD COLD RIVER (SINGLE SPUR LINE).

Newcomb, 7.3 miles north of, 0.8 mile west of Moose Pond, on road to Cold River at top of hill, 30 feet east of road, on large rock; bronze tablet stamped "1910 FT. COVINGTON 1901".	1,909.615

PRESTON PONDS, SOUTH ALONG TRAIL AND PUBLIC ROADS VIA UPPER IRON WORKS, TO TAHAWAS.

[Excessive error distributed in this line.]

Preston Pond, 800 feet south of, on east margin of trail between Preston Pond and Henderson Lake, in face of rock; bronze tablet stamped "2180 FT. COVINGTON 1901"	2,179.791
Upper Iron Works, opposite Tahawas Club House, 65 feet east of road; on large rock; bronze tablet stamped "1771 FT. COVINGTON 1901"	1,770.881

LAKE PLACID QUADRANGLE.

Lake Placid, 0.4 mile south of station on road to Averyville, on west margin of road, in large rock; aluminum tablet stamped "1750 FT. COVINGTON 1901"	1,750.339

SARANAC QUADRANGLE.

LAKE PLACID, ALONG RAILROAD TO SARANAC LAKE.

Lake Placid, 2.8 miles west of, north end of west abutment of stone culvert; top of bridge seat, chiseled square	1,631.88
Lake Placid, 4.5 miles west of, north end of east abutment of stone culvert; top of parapet wall, chiseled square	1,570.97
Ames Mills, at road crossing; top of rail	1,569
Saranac Lake, Baptist Church, opposite Franklin Hotel, in north face of foundation wall; aluminum tablet stamped "1549 FT. COVINGTON 1901"	1,548.97

SARANAC LAKE, NORTHWEST ALONG THE NEW YORK CENTRAL RAILROAD VIA LAKE CLEAR, TO SARANAC JUNCTION.

	Feet.
Saranac Lake, in front of New York Central Railroad station; top of rail	1,574.0
Lake Clear (Saranac Junction), in front of station; top of rail	1,632.7
Lake Clear (Saranac Junction), 800 feet south of station, railroad water tank, on top of southeast foundation stone nearest track; chiseled square	1,630.25

SARANAC LAKE, SOUTHWEST ALONG STATE ROAD VIA AMPERSAND HOTEL, TO CLEARING (SINGLE SPUR LINE).

Saranac Lake, 6.4 miles southwest of, on north edge of clearing, on face of large rock; aluminum tablet stamped "1678 FT. COVINGTON 1901"	1,678.218

LAKE CLEAR JUNCTION, NORTHEAST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD VIA PAUL SMITH STATION, TO ONCHIOTA.

Lake Clear Junction, west side of railroad, southeast corner of foundation stone of water tower; aluminum tablet stamped "1630 FT. COVINGTON"	1,630.474
Paul Smith station, road crossing at station; top of rail	1,701.2
Paul Smith station, 665 feet west of track, 225 feet north of road to post-office, in bowlder; bronze tablet stamped "1704 FT. COVINGTON"	1,703.800
Rainbow Lake, road crossing at station; top of rail	1,708.5
Onchiota, 200 feet south of station, east side of track, in big bowlder; aluminum tablet stamped "1710 FT. COVINGTON"	1,710.514

PAUL SMITH STATION, EAST ALONG PUBLIC ROADS TO BLOOMINGDALE, THENCE NORTH VIA VERMONTVILLE TO ONCHIOTA.

Bloomingdale station, road crossing; top of rail	1,555.8
Bloomingdale station, iron bridge, 70 feet east of north side of road, in large bowlder; aluminum tablet stamped "1530 FT. COVINGTON"	1,529.666
Vermontville, 5.6 miles north of, road crossing, in large bowlder; aluminum tablet stamped "1776 FT. COVINGTON"	1,776.288

ST. REGIS QUADRANGLE.

SARANAC JUNCTION, SOUTHWEST ALONG THE NEW YORK CENTRAL RAILROAD, TO TUPPER LAKE JUNCTION.

Saranac Inn, in front of station; top of rail	1,622.3
Saranac Inn, 1.7 miles west of, 200 feet south of milepost (Herkimer 146), in middle of rock cut; aluminum tablet stamped "1632 FT. COVINGTON 1901"	1,631.920
Floodwood, at road crossing; top of rail	1,594.0

PAUL SMITH STATION, WEST ALONG PUBLIC ROADS VIA PAUL SMITH POST-OFFICE TO BRANDON.

Paul Smith post-office (Corning Point), 900 feet south of store, in bowlder; aluminum tablet stamped "1632 FT. COVINGTON"	1,631.943
Paul Smith post-office, 2.8 miles west of, at powerhouse; northeast corner of concrete dam	1,620.77
Brandon, in front of station; top of rail	1,603.3

AT WAWBEEK.

Wawbeek, 100 feet west of road corners, at south side of road, in bowlder; aluminum tablet stamped "1650 A"	1,650.771

ESSEX, HAMILTON, AND WARREN COUNTIES.

BLUE MOUNTAIN, INDIAN LAKE, NEWCOMB, SCHROON LAKE, AND THIRTEENTH LAKE QUADRANGLES.

The elevations in the following list result from a readjustment of leveling previously reported upon in the Appendixes to the Eighteenth, Twentieth, and Twenty-first Annual Reports. The nearest precise-level elevation is at North Creek.

The leveling on most of Indian Lake and Thirteenth Lake quadrangles was done in 1896 under the direction of Mr W. H. Lovell, topographer, by Mr. Clark Brown, levelman; the remainder on these and on the other quadrangles was done in 1896 under the direction of Mr. W. M. Beaman, topographer, by Mr. A. F. Krause, levelman, except on line to establish

bench mark southwest of Grove, which was done in 1899 under Mr. A. M. Walker, topographer, by Mr. W. W. Gilbert, levelman. The standard bench marks, except one south of Grove House, were set in 1896, and are stamped with figures mostly 4 feet too great, the original starting elevation having been that much in error.

INDIAN LAKE QUADRANGLE.

	Feet.
Wakely dam, 25 feet east of north of log house; in bowlder copper bolt stamped "2124".....	2,119.764

SPECULATOR, NORTH VIA JESSUPS RIVER AND LEWEY LAKE, TO INDIAN LAKE.

Speculator, small triangular park at crossroads, in bowlder; copper bolt stamped "U. S. G. S. 1772 Ft. B. M.".....	1,768.369
Camp Perkins, 0.3 mile east of, 50 feet west of Jessups River Bridge, on north bank of river, in outcrop 5 feet above center of bridge; copper bolt stamped "U. S. G. S. 1689 Ft".....	1,685.012
Lewey Lake, 100 feet from south shore of, 300 feet north of Lewey Lake House in bowlder 8 feet broad; copper bolt stamped "U. S. G. S. 1659 Ft. B. M.".....	1,654.964
Sabael, 3 miles southwest of, 900 feet southwest of Beaver Brook Bridge, outcrop 3 feet above and 20 feet north of road; copper bolt stamped "1799 Ft. U. S. G. S. B. M.".....	1,795.112

KINGS FLOW DAM, SOUTHWEST VIA CAMP COMFORT, TO SPECULATOR.

Camp Comfort (Ross Kunjamuk House), 2,000 feet south of, 8 feet east of road, in bowlder 6 by 4 by 2 feet; copper bolt stamped "1774 Ft.".....	1,770.375
Speculator, 3 miles northeast of, at Rylander Clearing, west of Elm Lake, 300 feet south of house foundation, 1,000 feet north of top of hill, in flat outcrop 6 feet west of road; copper bolt stamped "U. S. G. S. B. M. 1952 Ft.".....	1,947.992

THIRTEENTH LAKE QUADRANGLE.

NORTH CREEK, NORTHWEST TO NORTH RIVER.

North River, 40 feet west of northwest corner of Thirteenth Creek Bridge, 30 feet east of corner of house; copper bolt stamped "U. S. G. S. 1076".....	1,072.257
North River, 300 feet west of bridge at; top of copper bolt of Adirondack Survey triangulation station No. 118, 1882 (said to mark Warren-Essex County line).....	1,080.929

NORTH CREEK, SOUTHWEST VIA SODOM AND BAKERS MILLS, TO MOUNTAIN HOUSE.

Bakers Mill Pond, under southwest corner of bridge over North Creek; southwest edge of casting.....	1,016.86
Bakers Mills, 50 feet north of blacksmith shop and 25 feet west of road, in bowlder 6 feet broad and 2 feet above ground; copper bolt stamped "U. S. G. S. B. M. 1585 Ft.".....	1,581.042

GRIFFIN TO MOUNTAIN HOUSE.

Oregon, 2.5 miles southwest of, 300 feet northeast of Stuarts Creek and east of Sacandaga River, point 5 feet west of road on outcrop; copper bolt stamped "U. S. G. S. 1377 Ft. B. M."	1,373.140
Oregon, 1,000 feet northeast of the North House (McKlosky's) and 150 feet north of curve to right in road, bowlder 5 by 10 feet to right of road; copper bolt stamped "U. S. G. S. B. M. 1435 Ft.".....	1,431.005

MOUNTAIN HOUSE, NORTHWEST VIA THIRTEENTH LAKE AND KINGS FLOW DAM, TO INDIAN LAKE.

Big Shanty dam, 200 feet southeast from east end of, in bowlder 3 feet high and 8 feet broad; copper bolt stamped "U. S. G. S. 1666 Ft. B. M.".....	1,662.383
Thirteenth Lake House, 75 feet in front of, in low flat outcrop; copper bolt stamped "U. S. G. S. 1874 Ft. B. M.".....	1,869.761
Kings Flow dam, 500 feet northwest of bridge at, 10 feet to right of and 1 foot above road; copper bolt stamped "U. S. G. S. 1724 Ft. B. M.".....	1,720.016

SCHROON LAKE QUADRANGLE.

NORTH CREEK, NORTH VIA MINERVA, TO AIDEN LAIR.

Minerva, in north end of picket fence southeast of Kellogg House, in large bowlder 15 feet to right and 1.5 feet above road; copper bolt stamped "U. S. G. S. 1393 Ft. B. M.".....	1,389.009
Minerva, 1.75 miles north of, 80 feet east of Kellogg House at junction of road to North Woods Club, south of schoolhouse, 26 feet to right of and 7.3 feet above center of road, in outcrop; copper bolt stamped "U. S. G. S. 1742 Ft. B. M.".....	1,737.854

NEWCOMB QUADRANGLE.

	Feet.
Aiden Lair lodge, 50 feet southeast of, in bowlder; copper bolt stamped "U. S. G. S. 1659 Ft. B. M."	1,655.022

NORTH RIVER, NORTHWEST VIA SUMMIT, TO INDIAN LAKE.

Indian Lake, 4 miles east of, southeast of Spring's white house, in front of log house 10 feet to left of road; copper bolt stamped "U. S. G. S. B. M. 1834 Ft."	1,830.049

AIDEN LAIR, NORTH TO TAHAWUS, THENCE WEST TO NEWCOMB.

Tahawus, 2 miles south of, 0.6 mile northwest of Daniel Havron's house, in large bowlder 12 feet to left of road; copper bolt stamped "U. S. G. S. 1737 Ft. B. M."	1,732.862
Hudson River Bridge, on top of coping at downstream end of west abutment; chiseled mark.	1,563.41
Newcomb Methodist Church, 85 feet northeast of door, 16 feet to left and 1.3 feet above center of road; copper bolt stamped "U. S. G. S. 1640 Ft. B. M."	1,637.051

NEWCOMB, WEST TO HAMILTON-ESSEX COUNTY LINE.

Rich Lake, south side of, 460 feet back from Abner Beldin's house, on large bowlder, 14 feet to right of and 3.8 feet above center of road; copper bolt stamped "U. S. G. S. 1603 Ft. B. M."	1,599.473

INDIAN RIVER, NORTHEAST DOWN SAME, FROM BRIDGE EAST OF INDIAN LAKE VILLAGE, TO MOUTH.

Indian River Bridge, west abutment, near front angle of coping on upstream end; chiseled square	1,597.78
Hudson River, southwest bank, junction with north bank of Indian River; circular chisel mark and letter "S" on large bowlder	1,424.32

MOUTH OF INDIAN RIVER, NORTHEAST VIA NORTH WOODS CLUB AND MOOSE POND CLUB, TO AIDEN LAIR.

Hudson River, junction of southwest bank with northwest bank of Indian River, in recess at upper southwest corner of bowlder; copper bolt stamped "U. S. G. S. 1428 Ft.B. M."	1,423.897
North Woods Club House, bowlder 200 feet northeast of; copper bolt stamped "U. S. G. S. 1769 Ft. B. M."	1,764.825
Moose Pond Club House, 100 feet northwest of; in large bowlder near shore; copper bolt stamped "U. S. G. S. 2095 Ft. B. M."	2,091.399

MOUTH OF INDIAN RIVER, NORTHWEST TO CHAIN LAKES.

Cedar River, south bank of, 2 miles west of Hudson River, 20 feet southwest of ferry on road to Chain Lakes, in outcrop; copper bolt stamped "U. S. G. S. 1549 Ft. B. M."	1,544.603
Chain Lakes, 50 feet south of third lake, 12 feet above water surface in outcrop, 1,100 feet northwest of hotel; copper bolt stamped "1615"	1,610.793

BLUE MOUNTAIN QUADRANGLE.

Indian Lake Village, 0.7 mile south of, west end of smooth sloping outcrop 75 feet in length, 10 feet from road, 20 feet east of elm tree 8 inches in diameter; copper bolt stamped "U. S. G. S. 1793 Ft. B. M."	1,788.807

CEDAR RIVER HOUSE, SOUTHWEST TO WAKELY DAM.

Wakely dam, 4.8 miles north of, 0.7 mile southwest of Browns House, 20 feet north of bridge over small stream flowing east into Cedar River, 15 feet to right of road; copper bolt stamped "U. S. G. S. B. M. 1,918"	1,913.585

CEDAR RIVER HOUSE, NORTHWEST TO BLUE MOUNTAIN LAKE.

Forest House, 25 feet of north of west of northwest corner of barroom, in outcrop; copper bolt stamped "U. S. G. S. 1941 Ft. B. M."	1,937.247
Blue Mountain Lake, 3 miles southeast of, bridge over Rock River, on downstream end of easterly abutment; chiseled square	1,774.56

BLUE MOUNTAIN LAKE, NORTH TO LONG LAKE.

Blue Mountain Lake, foundation of schoolhouse, in second stone from southwest corner of second course from top; bronze tablet stamped "1810"	1,805.700
Long Lake, 5.5 miles south of, east side of South Pond, 12 feet to left and 2.5 feet above center of road, in bowlder; copper bolt stamped "U. S. G. S. 1855 Ft. B. M."	1,851.176

	Feet.
Long Lake, 260 feet west of Sabattis's two-story frame house, in west end of outcrop, 130 feet to left of center of road; copper bolt stamped "U. S. G. S. 1663 Ft. B. M."	1,658.685
Long Lake, front line of Lake House, 35 feet south of house, on bowlder; chiseled mark ("Colvins B. M. 71 A")	1,636.64
Long Lake, 2.75 miles southwest from Grove House; 130 feet east of fork in State road to Forked Lake, 50 feet south of road, north face of large bowlder; aluminum tablet stamped "1726 ALBANY"	1,726.514

LONG LAKE, EAST TO ESSEX-HAMILTON COUNTY LINE.

Long Lake, 4 miles east of, 35 feet west of 4-mile post, in outcrop 14 feet to right and 2.5 feet above center of road; copper bolt stamped "U. S. G. S. 1863 Ft. B. M."	1,858.465
Essex-Hamilton County line, 0.87 mile west of, south side of Fishing Brook, in bowlder 12 feet to left of and 3.5 feet above center of road; copper plug stamped "U. S. G. S. 1698 Ft. B. M."	1,694.227

HAMILTON, HERKIMER, AND ONEIDA COUNTIES.

LITTLE FALLS, McKEEVER, OLD FORGE, REMSEN, UTICA, WEST CANADA LAKES, AND WILMURT QUADRANGLES.

The elevations in the following list result from a readjustment of leveling reported upon in the Appendixes to the Eighteenth, Nineteenth, and Twentieth Annual Reports of the Director of the United States Geological Survey, with a few additions.

The leveling was done as follows: On Utica quadrangle, under Mr. J. H. Jennings, topographer, in 1896, by Mr. A. B. Pomme. On Little Falls quadrangle, under Mr. C. C. Bassett, topographer, in 1898, by Mr. Clark Brown, levelman; under Mr. A. M. Walker, topographer, in 1898, by Messrs. E. L. Faison and M. S. McDiarmid, levelmen; and under Mr. Jennings, in 1896, by Mr. A. B. Pomme. On Remsen quadrangle, under Mr. W. H. Lovell, topographer, in 1897, by Mr. E. L. McNair, levelman; under Mr. Jennings, in 1897, by Mr. Brown and also under Mr. Bassett by Mr. L. T. Haney, levelman. On Wilmurt quadrangle, under Mr. Lovell, in 1897, by Mr. McNair; and under Mr. Walker, in 1898, by Mr. McDiarmid. On McKeever and Old Forge quadrangles under Mr. Jennings, in 1897, by Mr. Brown, and under Mr. Walker, in 1898, by Mr. C. H. Semper, levelman. On West Canada Lakes quadrangle, under Mr. Walker, in 1898, by Messrs. Semper and McDiarmid. The standard bench marks are stamped variously "R," "A," and "ALBANY," and also without datum letters, and with figures of elevation mostly correct except those set in 1896, which are usually 2 feet too great.

UTICA QUADRANGLE.

	Feet.
Utica, rear of post-office building, west of east basement door; bronze tablet stamped "419".	417.207
Utica, Turner street, Herkimer-Oneida County line, on fence line between the New York Central and Hudson River Railroad and trolley tracks; bronze meridian tablet	466.329
Utica, Albany street, Starch Factory Creek, stone-arch bridge, north abutment, west wing; northeast corner of top step	522.90
Utica, the Delaware, Lackawanna and Western and the Rome, Watertown and Ogdensburg railroads; northwest corner of foundation of northwest pier (New York Central and Hudson River Railroad bench mark)	408.79

STEWARTS CORNERS, VIA MOYER CREEK, TO FRANKFORT.

Rushmer road, first barn east of Stewarts Corners, between third and fourth telegraph poles Nos. 9588 and 9587 east of barn, on bowlder half in road and half in field; copper bolt stamped "U. S. G. S. 1380 feet B. M."	1,378.477
Lock No. 45, canal engineer bench-mark No. 204, at coping at end of northeast gate; towpath lock, stamped "⊕"	427.326

SAUQUOIT, EAST ALONG HIGHWAY, TO NORWICH CORNERS.

Norwich Corners, south face near east end of residence of H. A. Smith, in foundation wall; aluminum tablet stamped "1318 ADJ 1903"	1,318.155

UTICA, NORTH VIA TRENTON PLANK ROAD, TO SOUTH TRENTON.

Deerfield, J. A. Auert's brick building, middle door; north corner of stone doorsill	427.68
Salem Welsh Church, Trenton plank road, 600 feet west from plank road, on foundation *stone at southeast* corner; chisel mark	815.70

	Feet.
Ninemile Creek Bridge, Trenton plank road, on west bridge seat, north abutment; chiseled square	755.82
South Trenton, north side of road opposite west gate of cemetery, on bowlder; copper bolt stamped "U. S. G. S. B. M. 806 Ft."	803.938
SOUTH TRENTON, EAST VIA NORTH GAGE, TO POLAND, THENCE SOUTHEAST TO NEWPORT.	
North Gage Church, on southeast corner of stone step; chiseled square	986.00
Poland, Main street, center of stone arch over Cold Brook, on west coping; chiseled square	720.38
Poland, first iron bridge over Cold Brook northeast of village, in foundation stone, east abutment, north wing; copper bolt stamped "U. S. G. S. B. M. 800 Ft."	798.841
Poland, 0.5 mile south of, north wing of iron highway bridge over West Canada Creek, on east abutment bridge seat; chiseled square	690.86
Newport, stone bridge over West Canada Creek, in north coping over center pier, 6 inches south of square chisel mark and flush with coping; copper bolt stamped "U. S. G. S. 658 Ft. B. M."	656.450
Ilion, Steel Creek Aqueduct, Erie Canal, in center of third coping stone from west end, parapet wall, towpath side; copper bolt stamped "U. S. G. S. B. M. 410 Ft." (0.027 foot higher than State engineer's B. M. No. 197)	408.574
FRANKFORT, TO POINT 5.6 MILES NORTH OF FRANKFORT, IN TOWN OF SCHUYLER.	
West Shore Railroad crossing; top of south rail	400.4
Frankfort station, Mohawk River Bridge, near north abutment, east wing, on bridge seat; chiseled square	398.57
Frankfort, near station, New York Central Railroad crossing; top of south rail	400.00
Frankfort, 5.6 miles north of, at southwest corner of road crossing; iron post stamped "U. S. G. S. B. M. 580 Ft."	577.793
LITTLE FALLS QUADRANGLE.	
LITTLE FALLS, EAST TO INGHAMS MILLS, THENCE NORTH TO SALISBURY CENTER.	
Little Falls, engineer's bench mark at Lock No. 36, Erie Canal	343.487
Little Falls, southeast corner of Ann and Albany streets, northwest corner of brick building with stone foundation; aluminum tablet stamped "397"	397.118
Little Falls, 2 miles east of, Erie Canal Lock No. 37, northeast corner; top of coping stone, chiseled cross	353.535
Manheim, in front of station; top of south rail	604.5
Inghams Mills, 27 feet east of Little Falls and Dolgeville Railroad track, 120 feet north of road crossing, on rock in place 6 feet above ground; aluminum tablet stamped "726 A".	726.870
SALISBURY CENTER, WEST VIA FAIRFIELD, TO MIDDLEVILLE.	
Salisbury Center, brickwork in rear of Universalist Church; aluminum tablet stamped "1065 A"	1,064.372
Salisbury Corners, church near northeast corner of crossroads, stone entrance, lower step, south end of face corner; chiseled square	1,214.22
Fairfield, Military Academy laboratory building, front of south end, in stonework 3 feet above ground; aluminum tablet stamped "1278 A"	1,277.867
Fairfield, Military Academy laboratory building, front of south end, projection on corner stone 1 foot above ground; old bench mark marked "1276.829 above tide at Troy"	1,276.240
MIDDLEVILLE, NORTH TO NORWAY, THENCE EAST AND SOUTH TO SALISBURY CENTER.	
Middleville, 3.5 miles north of, 200 feet north of road to east by stone schoolhouse, east end of stone culvert; chiseled square	777.00
Norway, northwest corner of crossroads opposite hotel, west end of stone foundation of building, 1 foot from face corner; aluminum tablet stamped "1320 A"	1,319.830
Salisbury Center, 5.5 miles north of, 80 feet north of Jerseyfield Lake road, in outcrop 1 foot from southeast corner of Willis Nichols's barn; aluminum tablet stamped "1618 A"	1,618.535
Salisbury, 2.3 miles north of, at Curtis schoolhouse, east and west road crossing; stone step marked with circle	1,426.08
NEWPORT, ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD SOUTHEAST, TO MIDDLEVILLE, THENCE SOUTH TO HERKIMER.	
White Creek, iron bridge, on south abutment of bridge seat, east wing; chiseled square	632.77
City Brook, on south end of east parapet wall of stone arch, on coping stone; chisel mark	609.03
Canyon Brook, stone arch over, south end of east parapet wall, on coping stone; chiseled square	591.26

	Feet.
Middleville, West Canada Creek; north coping of west abutment of iron highway bridge, marked "⊙"	572.35
Middleville, West Canada Creek, in coping of iron bridge, west abutment, north wing; copper bolt stamped "U. S. G. S. B. M. 572"	570.861
Herkimer County poorhouse, in north corner of bottom of flagstone, front entrance; chiseled square	591.21
Countryman station, Atlantic and St. Lawrence (Grand Trunk) Railroad, Bridge No. 10, north abutment, west wing wall, close to angle, on coping stone; chiseled square	492.31
West Canada Creek, Dempsters Bridge, 0.5 mile north of Kasts Bridge, north abutment, west wing; bridge seat marked "⊙. B. M."	473.80
West Canada Creek, Kast Bridge (railroad station), west abutment, north wing; bridge seat stamped "⊙. B. M."	457.51
Herkimer waterworks, north door of pump house; northwest corner of doorstep, stamped "⊙. B. M. 5"	402.03
Herkimer, county clerk's office on Court street, left of main entrance, in stone water table; aluminum tablet stamped "407 A"	406.975

REMSEN QUADRANGLE.

SOUTH TRENTON, VIA PROSPECT, HINCKLEY, AND NORTHWOOD, TO NEAR WILMURT.

Trenton, Rome, Watertown and Ogdensburg Railroad station, south door of waiting room, 0.42 foot west of door jamb; water table	840.65
Prospect station, Rome, Watertown and Ogdensburg Railroad crossing over highway just north of, on lower step of south abutment, east side; chiseled square	984.93
Prospect post-office, 0.22 mile north of, in field opposite creamery and east of road, in bowlder 3 by 7 by 12 feet; copper bolt stamped "1142 R"	1,141.105
Hinckley, 0.25 mile west of Empire Hotel, stone culvert north side of road, on east end of wall; chiseled square	1,181.05
Hinckley, 2.3 miles northeast of, and about 1.1 miles west of Oneida-Herkimer County line, in Remsen Township, 55 feet from road center, in pasture, west side of road, in bowlder; copper bolt stamped "1262 R"	1,261.647
Northwood, on stone abutment at northwest corner of iron bridge over stream at sawmill; chiseled square	1,207.49
Northwood, 2.8 miles east of, 3,450 feet west of abandoned house south of road, 7 feet north of center of road, on large bowlder; copper bolt stamped "1258 R"	1,257.696

OHIO, SOUTH TO POLAND.

Ohio, 2.6 miles southwest of, on stone foundation at northeast corner of iron bridge over Black Creek; chiseled square	1,236.15
Cold Brook, 3.4 miles north of, 3.6 miles south of Ohio, 480 feet south of road from southwest and 1 mile south of crossing of Black Creek, in Prussian Township, on west side of road, 3 feet from wire fence; copper bolt stamped "1265 R"	1,264.710

PROSPECT, NORTH ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO FORESTPORT.

Prospect, 1,000 feet northeast of station, on Hinckley Branch Railway, on parapet north side of culvert, on northwest corner of coping; chisel mark "O B. M. 55"	1,146.83
Remsen, north er[illegible] of retaining wall between lower milldam and Rome, Watertown and Ogdensburg Railroad, in end of coping near face corner; bronze tablet stamped "1172"	1,171.464
Honnedaga station, 0.25 mile north of, 40 feet west of track, opposite cattle guard, in bowlder 6 by 15 feet; copper bolt stamped "U. S. G. S. 1209 R"	1,208.354
Forestport station, 2 miles south of, north end of Black River (reservoir) Bridge, on west end of coping of parapet; chiseled square	1,178.95
Forestport, 0.3 mile north of station, at Meekville, north end of railroad bridge over Little Woodhull Creek, west end of parapet coping; copper bolt stamped "U. S. G. S. R 1199 Ft. B. M."	1,199.054

FORESTPORT, ALONG ROAD EAST TO ENOS, THENCE NORTHEAST TO ATWELL.

Enos, 0.7 mile southeast of, Oneida-Herkimer County line, at forks of roads to northeast and to Maple Lake; top of stone	1,387.80
Maple Lake, outlet of, 1.0 mile southeast of Enos, west abutment of bridge; copper bolt stamped "1318 U"	1,317.970
Reeds Mill, east side of south abutment of bridge over Black River; copper bolt stamped *"1598 R"*	1,597.267

WILMURT QUADRANGLE.

HUBBARD HOTEL, SOUTH TO OHIO.

Feet.

Wilmurt, 3 miles west of, 0.18 mile east of Hubbard Hotel, 60 feet south of road, 25 feet east of fence, in meadow; chiseled point on painted bowlder marked "E" (State bench mark). 1,276.32

Ohio, 750 feet west of corner near church, 1,200 feet east of schoolhouse and 80 feet north of road, in field belonging to G. Johnson; copper bolt stamped "1374 R" 1,373.809

FROM NEAR WILMURT, NORTHEAST VIA NOBLEBORO, TO HONNEDAGA LAKE.

Wilmurt, 0.7 mile west of, 165 feet east of Henry Paull's Hotel, in pasture, 70 feet south of center of road; bronze tablet stamped "1402 Ft. R" 1,401.249

Nobleboro, 225 feet east of hotel, 4 feet from fence on north side of road, on small bowlder; chiseled square 1,418.71

Nobleboro, 2.4 miles north of, 225 feet west of Haskell Hotel, 8 feet south of center of road, on large bowlder; chiseled point (State bench mark No. 9) 1,574.23

SALISBURY CENTER, NORTH ALONG ROAD, TO MOREHOUSEVILLE.

[The error distributed in this line is excessive.]

Jerseyfield Lake, 200 feet west of outlet, 100 feet south of lake, in yard of Mrs. Williams's tenant house, on large bowlder; tablet stamped "1941 A" 1,941.916

NOBLEBORO TO MOREHOUSEVILLE.

Morehouseville, 940 feet east of road south from post-office, 425 feet east of schoolhouse, 15 feet south of center of road to Piseco Lake, in flat ledge; copper bolt stamped "1909 Ft. B. M.". 1,910.160

M'KEEVER QUADRANGLE.

FORESTPORT, NORTH TO WHITE LAKE.

White Lake station, 2 miles south of, near Nicholl's mills, on face of coping, at northwest corner of Bear Creek railroad bridge; chiseled square 1,370.08

WHITE LAKE, NORTHEAST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD VIA M'KEEVER, TO FULTON CHAIN.

White Lake station, 50 feet west of railroad, 10 feet north of wagon road, in bowlder 5 feet broad; copper bolt stamped "1421 A" 1,420.664

White Lake station, 2.5 miles north of, 100 feet north of White Lake Granite Company's switch, west of track at foot of embankment; iron staple in bowlder 20 feet broad 1,456.819

McKeever, 600 feet south of station, west of track, in rock in cut; copper bolt stamped "U. S. G. S. 1544 Ft. B. M." 1,543.828

McKeever, 2 miles north of, iron railway bridge No. 6 (20-foot span), northwest wing, near face corner end of coping; chiseled square 1,559.12

McKeever, 3.5 miles north of at railroad bridge No. 37 (90-foot span) over Moose River, 1 foot from girder, north abutment, west end on face angle; chiseled square 1,641.34

Minnehaha station, Moose River Bridge, north end, east end of parapet, on face corner; chiseled square 1,681.39

Fulton Chain station, 3 miles southwest of, 500 feet north of house, south end of culvert, on north end of parapet; chiseled square 1,714.28

WHITE LAKE, EAST TO NORTH LAKE (ATWELL POST-OFFICE).

North Lake (Atwell), 6.3 miles northwest of, at junction of road to Woodhull Lake; aluminum tablet in top of rock stamped "1947 A" 1,947.329

Woodhull, in front of State House, in line with back edge of dam; ½-inch copper bolt 1,883.072

OLD FORGE QUADRANGLE.

FULTON CHAIN, NORTHEAST ALONG ROAD VIA OLD FORGE AND NORTH SIDE OF FULTON CHAIN LAKES, TO EAGLE BAY.

Fulton Chain, 5 feet north of Wakeley's Hotel, 8 feet east of railroad track, in bowlder; bronze tablet stamped "R 1712" 1,711.854

Old Forge, 0.25 mile west of railroad station, at picnic ground, in bowlder 7 by 12 by 15 feet, north of railroad track; bronze tablet stamped "R 1733" 1,732.515

Third Lake, Fulton Chain, at Bald Mountain House, 40 feet east of dock, 8 feet from north shore of lake; iron post stamped "R 1712" 1,712.164

SIXTH LAKE, SOUTHEAST TO FAWN LAKE.

	Feet.
Sixth Lake, Fulton Chain, 125 feet east of north end of dam, in bowlder 4 by 10 feet, 4 feet from edge of dock; bronze tablet stamped "R 1788"	1,787.422
Sixth Lake dam, 1.6 mile south of, summit of Seventh Lake Mountain, in bowlder 5 feet broad, 8 feet west of road; chiseled square	2,134.07
Fawn Lake, 1.5 miles southeast of, on road from Sixth Lake to Kenwells, 900 feet south of summit, 25 feet north of small brook, in bowlder 12 feet square and 8 feet high, 10 feet east of road at south end of level stretch of road; bronze tablet stamped "R 2263"	2,262.079

WOODHULL, NORTHEAST VIA TRAIL TO NEAR PROCTORS CAMP, SOUTH BRANCH MOOSE RIVER (SINGLE-SPUR LINE).

Bisby lodge, on west shore of Bisby First Lake, about 400 feet north from lodge, 10 feet from bank, in shallow water, in 5 by 10-foot bowlder; bronze tablet stamped "2035 R"	2,034.375
Deadmans Gulch, east of mouth, 20 feet north of Canachagala Stillwater of South Branch Moose River, near site of old dam, 14 feet above water, in large bowlder; copper bolt stamped "1769 R"	1,768.761

NORTH LAKE EAST TO HONNEDAGA LAKE.

North Lake (Atwell post-office), 100 feet east of State House, in rock; aluminum tablet stamped "1829 R"	1,828.245
Honnedaga Lake, 400 feet west of, on north side of road to North Lake, in large rock; bronze tablet stamped "2221 A"	2,221.110
Honnedaga Lake, Herkimer Landing, 325 feet from lake, 35 feet southwesterly from corner of barn, in very large bowlder; copper bolt stamped "2223 Ft. R"	2,222.668
Honnedaga Forest Lodge, in south face of large bowlder 50 feet north of office building; aluminum tablet stamped "2205 A"	2,205.015

HONNEDAGA, NORTHEAST VIA THIRD STILLWATER, WEST CANADA LAKES, AND CEDAR LAKES, TO LITTLE MOOSE LAKES.

Honnedaga, 1.3 miles east of, at Herkimer-Hamilton County line, north side of trail, in large bowlder (transit station No. 21 of county-line survey); bolt	2,149.390

WEST CANADA LAKES QUADRANGLE.

Honnedaga, 7.8 miles east of, 250 feet east of ford of West Canada Creek, near head of Second Stillwater, in bowlder; aluminum tablet stamped "2168 A"	2,168.067
Mud Lake dam, 125 feet north of sluice of, 100 feet north of Indian hut, in large white bowlder; aluminum tablet stamped "2356 A"	2,355.722
Buck, 400 feet east of Cedar Lake, on trail to Speculator, northwest corner of camp; copper bolt stamped "U. S. G. S. B. M. 2472 Ft. A"	2,472.429

LITTLE MOOSE LAKE, WEST TO FAWN LAKE.

Little Moose Lake, 200 feet from, in rear of log house, in large rock; copper bolt stamped "2143 A"	2,144.184
Little Moose Lake, 4.5 miles west of, on road to Kenwells, 0.3 mile west of Silver Run, at summit of hill, in large rock 5 feet south of road; aluminum tablet stamped "2049 A"	2,049.583
Kenwells, 3,150 feet northeast of, north side of road to Fourth Lake and Wakely dam, in large rock; aluminum tablet stamped "1854 A"	1,855.475

THIRD STILLWATER, WEST CANADA CREEK SOUTHEAST TO SPRUCE LAKE.

Spruce Lake, east side of, at Clark's camp, in large bowlder; copper bolt stamped "2382 A".	2,382.139

HAMILTON, SARATOGA, AND WARREN COUNTIES.

LAKE PLEASANT AND STONY CREEK QUADRANGLES.

The elevations in the following list are based upon the heights of adjoining bench marks as published in this bulletin in accordance with the 1903 adjustment. The leveling on Stony Creek quadrangle was done partly in 1896 under the direction of Mr. W. H. Lovell, topographer, by Mr. Clark Brown, levelman; and partly in 1904 under the direction of Mr. Glenn S. Smith, topographer, by Mr. L. E. Tucker, levelman. The leveling on Lake Pleasant quadrangle was begun in 1896 under Mr. Lovell by Mr. Brown, extended in 1898 under Mr. A. M. Walker, topographer, by Mr. W. W. Gilbert, levelman, and completed in 1904 by *Mr. Tucker, levelman,* under Mr. Smith. Standard bench marks latest established are

stamped with the legend "ALBANY 1903 ADJ" and that set in 1898 at Lake Pleasant is stamped "A" all in addition to the figures of elevation, but those set in 1896 are without letters and, having been derived originally from erroneous North Creek datum, are stamped with figures mostly 4 feet too great.

LAKE PLEASANT QUADRANGLE.

PISECO, NORTHEAST ALONG HIGHWAY, TO SPECULATOR.

	Feet.
Lake Pleasant, north side of stone jail, 6 inches east of northeast corner, 3.5 feet above ground; aluminum tablet stamped "1791 A"	1,790.543

NORTHVILLE, NORTHWEST ALONG HIGHWAY, TO SPECULATOR.

Hope schoolhouse, District No. 4, 75 feet west of, bowlder 15 feet north of road; copper bolt stamped "U. S. G. S. B. M. 832 Ft."	828.311
Wells, Hosley House, in back yard of hotel, on rock 15 feet broad and 5 feet high; bronze tablet stamped "1026"	1,022.170
Wells, east end of abutment of covered bridge; chiseled circle and "B. M. B. X."	988.62
Wells, 0.3 mile north of, patent line monument in yard of white house opposite road to east, in ground 15 feet southeast of house; stone marked "△" (triangle is 6 inches on each side)	1,018.00
Wells, 2.5 miles northwest of, angle of road to Hamilton Lake, 40 feet from each road, west of junction, bowlder 6 feet high and 15 feet broad; chiseled circle stamped "B. M. S."	1,593.24
Charley Lake, 25 feet southwest of schoolhouse opposite, in bowlder 8 feet broad; copper bolt stamped "U. S. G. S. B. M. 1719"	1,714.685
Gilman Lake, white house opposite center of, 10 feet east of road at trail to Griffin; stone 100 feet south of building marked with chiseled circle above legend "B. M. C. K." (located 15 feet north of a stone marked in a similar manner with legend "B. M. C. J.")	1,730.28

BENSON CENTER, NORTHWEST ALONG ROAD, TO POINT 1.5 MILES SOUTH OF SILVER LAKE, THENCE SOUTHWEST TO ARIETTA.

Silver Lake, 1.5 mile south of, on west bank of South Branch of Sacandaga Creek (Fly Stream) where crossed by Benson Center road, 10 feet north of Silver Lake trail, in large bowlder; bronze tablet stamped "1865 ALBANY 1903 ADJ"	1,865.009

STONY CREEK QUADRANGLE.

BATCHELLERVILLE, NORTH ALONG ROAD VIA MUD LAKE, TO WEST STONY CREEK, THENCE NORTHEAST TO KNOWELHURST.

West Stony Creek, 4.2 miles south of, at outlet of Mud Lake, 135 feet west of log camp, on north side of road, in bowlder; bronze tablet stamped "1689 ALBANY ADJ 1903"	1,689.369
West Stony Creek, 60 feet southeast from large stone chimney on south end of hotel, 20 feet southwest of southwest corner of ice house, in rock; bronze tablet stamped "1552 ALBANY 1903 ADJ"	1,552.773
Knowelhurst, southeast corner of foundation of Methodist Episcopal Church; bronze tablet stamped "1583 ALBANY"	1,584.375

WEST STONY CREEK, WEST VIA WILCOX LAKE TO WELLS-HOPE ROAD.

West Stony Creek, 3.7 miles west of, 20 feet east of south end of Bakertown flow dam, north side of road, in bowlder; aluminum tablet stamped "1355 ALBANY 1903 ADJ"	1,355.079

GILMAN LAKE, NORTHEAST ALONG HIGHWAY, TO GRIFFIN.

Griffin, 30 feet above milldam, 5 feet north of road, 5 feet south of river; copper bolt in rock, stamped "U. S. G. S. B. M. 1280 Ft."	1,275.948

FRANKLIN, HAMILTON, HERKIMER, AND ST. LAWRENCE COUNTIES.

BIG MOOSE, KILDARE, LONG LAKE, RAQUETTE LAKE, AND TUPPER LAKE QUADRANGLES.

The elevations in the following list are the result of a readjustment of leveling reported upon in the Appendixes to the Twentieth and Twenty-first Annual Reports of the Director of the United States Geological Survey, with a few additions. Refer to precise-level list for another elevation on Kildare quadrangle.

The leveling was done as follows: On Big Moose quadrangle, under Mr. A. M. Walker, topographer, in 1899, by Mr. W. W. Gilbert, levelman; and under Mr. J. H. Jennings,

topographer, in 1897, by Mr. Clark Brown, levelman. On Raquette Lake and Tupper Lake quadrangles, under Mr. Walker, in 1899, by Messrs. Gilbert and C. B. Bailey. On Long Lake quadrangle, under Mr. Walker, in 1899, by Messrs. Bailey and Gilbert; and under Mr. Glenn S. Smith, topographer, in 1901, by Mr. C. H. Semper, levelman. On Kildare quardangle, under Mr. Smith, in 1902, by Mr. A. T. Fowler, levelman. The standard bench marks are mostly stamped "ALBANY" in addition to figures of elevation most of which are 1 foot in error.

BIG MOOSE QUADRANGLE.

EAGLE BAY, FOURTH LAKE TO SIXTH LAKE DAM.

	Feet.
Fourth Lake, Fulton Chain, at Hess Inn, 175 feet east of sea wall, on lake front of lawn, 70 feet south of main hotel building, 40 feet north of boathouse and billiard room, on north bank of inlet of Fifth Lake Outlet, 3 feet northeast of sidewalk crossing; iron post stamped "R 1717"	1,716.417

FULTON CHAIN, NORTH ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO NEHASANE.

Clearwater, 600 feet south of, 35 feet east of tracks, in west face of large bowlder; bronze tablet stamped "1753 ALBANY"	1,751.911
Big Moose, 110 feet east of point of switch at east end of side track, 40 feet south of main track, 25 feet west of west line of Hennessey's Hotel, in northwest face of large bowlder; bronze tablet stamped "2036 ALBANY"	2,034.324
Woods Lake, 0.37 mile south of, 62 rail lengths south of station, 575 feet north of milepost No. 100, 125 feet south of small stream, 20 feet west of track, in northeast face of large bowlder; bronze tablet stamped "1881 ALBANY"	1,879.778
Beaver River, east side of railroad water tank, in east face of foundation stone under south support; aluminum tablet stamped "1693 ALBANY"	1,691.863
Keepawa station, 38 rails north of, 75 feet north of 90-mile post, 100 feet west of track, in east face of large bowlder; aluminum tablet stamped "1722 ALBANY"	1,720.968
Nehasane, 200 feet south of Mr. Ames's house (Nehasane station), 20 feet west of main track, in east face of ledge of rock; aluminum tablet stamped "1789 ALBANY"	1,787.530

TUPPER LAKE QUADRANGLE.

NEHASANE, NORTHEAST ALONG RAILROAD, TO LONG LAKE WEST.

Bog Lake, 1.25 miles north of, 35 rail lengths north of milepost 81 miles from Malone, 35 feet west of track, in east face of large bowlder; aluminum tablet stamped "1764 ALBANY"	1,762.673
Long Lake West, 215 feet north of People's Hotel, 30 feet east of track, in west face of outcrop of rock; aluminum tablet stamped "1789 ALBANY"	1,787.787

LONG LAKE WEST, NORTHEAST ALONG NEW YORK CENTRAL AND HUDSON RIVER RAILROAD TO TUPPER LAKE.

Horseshoe station, 50 feet north of, 50 feet west of track, in east face of large bowlder 1 foot above ground; aluminum tablet stamped "1739 A"	1,738.177
Childwood, 40 rail lengths south of station on left of track, in face of rock cut; aluminum tablet stamped "ALBANY 1713"	1,713.164

LONG LAKE WEST, SOUTHEAST VIA LITTLE TUPPER LAKE, TO LONG LAKE.

Long Lake West, 4 miles east of, opposite 15-mile post, 10 feet from road, in southeast face of large bowlder; aluminum tablet stamped "1839 ALBANY"	1,838.171
Little Tupper Lake, head of, at Loomis's camp, 150 feet southeast of camp, 25 feet from barn, north face of large bowlder; aluminum tablet stamped "1760 ALBANY"	1,758.446
Little Tupper Lake, 0.12 mile east of, 115 feet west of 10-mile post, 8 feet north of road, 25 feet west of blacksmith shop at Moynehan's lumber camp, west face of large bowlder; aluminum tablet stamped "1739 ALBANY"	1,738.170

KILDARE QUADRANGLE.

HORSESHOE, NORTH ALONG HIGHWAY, TO MASSAWEPIE LAKE, THENCE SOUTHEAST TO CHILDWOOD STATION.

Lake Massawepie, east side of, in yard of camp owned by Hotel Childwood, 30 feet west of road, *east of two houses, in* bowlder; bronze tablet stamped "1540 ALBANY"	1,540.209

RAQUETTE LAKE QUADRANGLE.

BRANDRETH STATION, EAST ALONG ROAD, VIA BRANDRETH AND RAQUETTE LAKES, TO LONG LAKE.

	Feet.
Brandreth Lake, Brandreth camps, northwest corner of clearing, 10 feet east of road, 40 feet south of edge of woods, south face of bowlder; aluminum tablet stamped "1915 ALBANY"	1,913.224
Brandreth Lake, foot of, 30 feet west of State road, 12 feet south of Brandreth Outlet, in northeast face of large bowlder; aluminum tablet stamped "1884 ALBANY"	1,882.656
Raquette Lake, Antlers Hotel, 30 feet west of ice house, in bed rock; aluminum tablet stamped "1811 ALBANY"	1,809.926
Raquette, Forked Lake Carry, at southwest corner of Carry and State road, 5 feet from road, 15 feet from Carry, in face of large bowlder; aluminum tablet stamped "1796 ALBANY"	1,796.420

BLUE MOUNTAIN LAKE, TO UPPER DOCK OF MARION RIVER CARRY.

Marion River Carry, opposite upper dock of, in the east face of ledge of rock on north side of road; aluminum tablet stamped "1793 ALBANY"	1,794.119

LONG LAKE QUADRANGLE.

TUPPER LAKE JUNCTION, EAST ALONG ROAD TO WAWBEEK, THENCE SOUTH TO LONG LAKE.

Tupper Lake Junciton, New York Central and Hudson River Railroad, Adirondack division, in foundation to water tank; aluminum tablet stamped "1555 ALBANY"	1,556.031
Tupper Lake, 3.75 miles east of, north side of road at crossing of Cornell forestry west line on top large bowlder 6 feet high; chiseled square	1,570.88
Raquette Falls, 150 feet west of Martin Talbot's, in bowlder; aluminum tablet stamped "ALBANY 1574"	1,574.634
Long Lake, island in lower end of, 120 feet west of Island House owned and occupied by Amos Robinson, in top of bowlder; aluminum tablet stamped "1638 ALBANY"	1,638.211

POINT 4 MILES WEST OF NEWCOMB, NORTH TO LAKE CATLIN (SINGLE-SPUR LINE).

Catlin Lake, Caughnawauga Club House, 50 feet east of boat house, large rock at edge of lake; aluminum tablet stamped "1603 COVINGTON 1901"	1,603.091

TUPPER LAKE SOUTH VIA MOODY TO JENKINS POND (SINGLE-SPUR LINE).[a]

Tupper Lake, 2.2 miles south of, at Simons Pond, end of iron bridge over Raquette River, east side; top of large bolt holding bridge plate on caisson pier	1,554.56
Tupper Lake, 10.6 miles south of, foot of Jenkins Pond, Litchfield Park, 50 feet east of farmhouse, at entrance to barn; aluminum tablet stamped "1748 COVINGTON 1901"	1,757.778

LONG LAKE, TO POINT 5 MILES NORTHWEST.

Long Lake, 5 northwest of, 250 feet north of Big Brook, 12 feet east of road, west face of large bowlder; aluminum tablet stamped "1722 ALBANY"	1,720.965

FULTON, HAMILTON, AND MONTGOMERY COUNTIES.

FONDA, GLOVERSVILLE, LASSELLSVILLE, AND PISECO QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. These elevations result from a joint adjustment with older work to accord with the 1903 adjustment.

The leveling on the Fonda quardrangles was done in 1896 under the direction of Mr. W. H. Lovell, topographer, by Mr. A. F. Krause, levelman; that on the Gloversville quadrangle was done under the direction of Mr. Lovell, partly in 1900 by Mr. William Kelley, levelman, and partly in 1896 by Messrs. Krause and Brown, levelmen; that on the Lassellsville quadrangle was done in 1901 under the direction of Mr. A. C. Roberts, topographer, by Mr. Kelley, and that on the Piseco quadrangle was done partly in 1898 under Mr. A. M. Walker, topographer, by Mr. C. H. Semper, levelman, and in 1902 under the direction of Mr. J. H. Jennings, topographer, by Mr. J. B. Maguire, levelman. All standard bench marks dependent on this datum are stamped with the letters "ALBANY" in addition to figures of elevation.

[a] Credit is due Mr. Wallace C. Johnson, Niagara Falls, N. Y., for a 10-foot correction made to this line by checked connection to first bench mark.

LASSELLSVILLE QUADRANGLE.

ST. JOHNSVILLE, NORTH ALONG ROAD VIA OPPENHEIM, TO EMMONSBURG, THENCE WEST TO SALISBURY CENTER.

	Feet.
St. Johnsville, southwest corner of Grace Church (Christian), in water table; aluminum tablet stamped "360 ALBANY"	360.523
Oppenheim, southwest corner of brick residence of John P. Swartout, on the western side, in limestone water table; bronze tablet stamped "1110 ALBANY"	1,109.818

EMMONSBURG, NORTH TO OREGON.

Stratford (Devereaux), near southwest corner of Crossman's Hotel, on southerly side, in foundation wall; bronze tablet stamped "1074 ALBANY"	1,074.472

OPPENHEIM, EAST ALONG ROAD VIA GAROGA, TO JOHNSTOWN.

Lassellsville, southeast corner of D. C. Leek's store, in foundation wall, east face; aluminum tablet stamped "1153 ALBANY"	1,152.959

ARIETTA, SOUTH TO CAROGA CORNERS.

Arietta, 240 feet north of Alex. Baudin's Hotel, on west side of road, in bed rock; bronze tablet stamped "1696 ALBANY"	1,696.974

CAROGA CORNERS, SOUTH TO GAROGA.

Rockwood, 0.67 foot from southeast corner of Caleb A. Long's residence, in south face of foundation wall; bronze tablet stamped "1045 ALBANY"	1,045.380

GLOVERSVILLE QUADRANGLE.

CAROGA CORNERS, NORTHEAST ALONG ROAD VIA BLEECKER CENTER, BENSON CENTER, AND BENSON, TO NORTHVILLE.

(The error distributed in this line is excessive.)

Caroga Corners, in field about 150 feet east of road intersection, in top of large bowlder; bronze tablet stamped "1527 ALBANY"	1,527.198
Benson Center Corners, 17 feet westerly from bars in wall, in field on farm of Ludwick Politch, on large bowlder; aluminum tablet stamped "1288 ALBANY"	1,288.862
Benson, 185 feet east of Methodist Church, nearly opposite Benson post-office, north side of road, in top of large bowlder; aluminum tablet stamped "1139 ALBANY"	1,138.783

PETERS CORNERS, SOUTH ALONG ROAD, TO BLEECKER VILLAGE (SINGLE-SPUR LINE).

Bleecker Village, in front of schoolhouse, District No. 4, on south side of road, in top of large bowlder; aluminum tablet stamped "1506 ALBANY"	1,505.840

JOHNSTOWN, NORTHEAST ALONG RAILROAD, TO MAYFIELD.

Johnstown, station of the Fonda, Johnstown and Gloversville Railroad, in first stone below brick work at west corner of building; bronze tablet stamped "652"	652.008
Johnstown, 2.12 miles north of, railroad bridge No. 5, on northeast corner of top stone, east end of abutment; chiseled square	749.62
Gloversville, station of the Fonda, Johnstown and Gloversville Railroad, in first stone below brickwork, 20 feet north of southwest corner of building; bronze tablet stamped "798"	798.136
Broadalbin, top of frog in switch at junction	813.1
Mayfield, platform at railroad station	743.0
Mayfield, 60 feet east of gristmill, 30 feet from creek, 90 feet south of railroad track, in broad bowlder; copper bolt stamped "U. S. G. S. B. M. 756 Ft."	752.199

FONDA QUADRANGLE.

AURIESVILLE, ALONG CANAL AND THENCE ALONG THE FONDA, JOHNSTOWN AND GLOVERSVILLE RAILROAD, TO JOHNSTOWN.

Auriesville, ⅛ mile west of West Shore Railroad station, northwest end of west wing, bridge over canal, north abutment, in corner stone; chiseled square (State engineer bench mark No. 106)	302.785
Auriesville, bridge over canal 0.5 mile west of West Shore Railroad station, in fourth course of north abutment, 1.5 feet east of east angle; cross cut in stone	302.32
Fultonville, bridge over Mohawk River, on top of coping of south abutment; chiseled square	294.04
Fonda, county court-house, in corner stone of fourth course of stones from top of foundation at northwest corner; bronze tablet stamped "294"	293.764

	Feet.
Cayadutta Creek, railroad bridge over, in northeast corner of coping stone, southeast end of north abutment; chiseled square	350.73
Sammonsville, station of the Fonda, Johnstown and Gloversville Railroad, in large stone at corner of foundation; chiseled square	387.24

PISECO QUADRANGLE.

OREGON, NORTH ALONG ROAD, TO RUDISTON.

Oregon, near northwest corner of schoolhouse, in large bowlder on east side of road; bronze tablet stamped "1511 ALBANY"	1,511.201
Oregon, 4.2 miles north of, 300 feet north of Pawley House, east side of road, in large table rock; aluminum tablet stamped '1674 ALBANY"	1,674.064
Rudiston, 1.7 miles south of, in east end of north abutment of highway bridge over outlet to Piseco Lake at mill; bronze tablet stamped "1666 ALBANY"	1,666.813

MILL, SOUTH ALONG ROAD, TO ARIETTA.

Arietta, 4.7 miles north of, in east side of road at Gus Avery's house, in large rock; bronze tablet stamped "1703 ALBANY"	1,703.252

MOREHOUSEVILLE, NORTHEAST ALONG ROADS AND TRAIL, TO METCALF LAKE (SINGLE-SPUR LINE).

Metcalf Lake, on bowlder on west side of trail; bronze tablet stamped "2380 ALBANY"	2,380.908

MOREHOUSEVILLE, EAST ALONG ROAD, TO PISECO.

Morehouseville, 2.7 miles east of, 50 feet west of church, south side of road, on rock; chiseled circle, with legend "B. M. G. of N. Y. State Land Survey"	1,832.82
Morehouseville, 7.8 miles east of, top of rock south side of road; chiseled circle	1,865.34
Piseco, Irondequoit Club House basement; aluminum tablet stamped "1703 A"	1,702.803

PISECO, NORTHWEST TO SPRUCE LAKE.

Piseco, 5 miles north of, 50 feet north of old road running northeast to old lumber camp, in large bowlder 10 feet east of road; copper bolt stamped "1964 A"	1,964.198

FULTON, SARATOGA, AND WARREN COUNTIES.

BROADALBIN, GLENS FALLS, LUZERNE, SARATOGA, AND SCHUYLERVILLE QUADRANGLES.

The elevations published in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. They result from leveling reported in the Twenty-first Annual Report of the Director, United States Geological Survey, and in Bulletin No. 185, readjusted to conform with the "1903 adjustment." For additional elevations on Saratoga and Luzerne quadrangles see precise-level lists.

The leveling was done under the direction of Mr. W. H. Lovell, topographer; on Glens Falls and Schuylerville quadrangles in 1898 by Mr. Clark Brown, levelman, and on remainder in 1899 by Mr. J. E. Thomas, levelman, except line Mayfield to Northville in 1896 by Mr. Brown. The standard bench marks are stamped with the letters "ALBANY" in addition to the figures of elevation, except on Schuylerville quadrangle which are stamped "A" with figures of elevation in most cases 1 foot too high, and at Cranberry Creek stamped 4 feet too high and without letters.

SCHUYLERVILLE QUADRANGLE.

SCHUYLERVILLE, VIA BURGOYNE AND STAFFORD, TO SARATOGA.

	Feet.
Schuylerville, in front of station; top of rail	175.0
Schuylerville, corner of College and Green streets; school building, under second window from west corner; bronze tablet stamped "216 A"	215.149
Victory Mills, in front of station; top of rail	192.7
Victory Mills, southwest corner of Gates avenue and Pine street, southeast corner of foundation of hotel, on projecting stone; chisel mark	200.64
Gates in front of station; top of rail	234.0
Burgoyne, bridge over Saratoga Lake outlet, north abutment, east face, corner of coping; chiseled square	210.75

	Fe[illegible]
Burgoyne, road crossing at station; top of rail	217
Stafford, in front of station; top of rail	209
Schuyler Junction, 1.5 miles west of, double-span bridge, center pier, southwest corner, coping; chiseled square	225

SARATOGA, ALONG THE FITCHBURG AND THE DELAWARE AND HUDSON RAILROADS NORTHEAST VIA GANSEVOORT, TO FORT EDWARD.

Saratoga, 5.5 miles northeast of, South Wilton Church, south side near front, in foundation; bronze tablet stamped "327 A"	326. 192
Gansevoort, 3.75 miles south of, railroad bridge over road, outside anchor; bolt in southeast wall plate	308. 90
Gansevoort, Empire House, south side, near front, in brickwork; bronze tablet stamped "246 A"	245. 213

SCHUYLERVILLE, TO CHAMPLAIN CANAL BRIDGE NO. 56.

Schuylerville, Ferry Street Canal Bridge, towpath abutment, north wing, face corner, second step from bottom; chiseled cross in circle (Canal bench mark No. 42)	105. 90
Schuylerville, 2 miles south of, Canal Bridge No. 56; towpath abutment, north wing, face corner; chiseled cross in circle (Canal bench mark No. 41)	107. 15

SCHUYLERVILLE, EAST TO BALD MOUNTAIN, THENCE SOUTH TO EASTON CORNERS, THENCE WEST TO SARLES FERRY.

Schuylerville, 1.5 miles north of, Canal Bridge No. 63, towpath abutment, south end, lower step, face corner; chiseled cross in circle (Canal bench mark No. 45)	107. 36
Schuylerville, 1.75 miles north of, Lock No. 10; coping, southeast anchor; chiseled cross in circle (Canal bench mark No. 46)	109. 05
Middle Falls, south bank of creek, 75 feet east of covered bridge, southeast corner of brick gristmill; bronze tablet stamped "303 A"	302. 767
North Easton (Easton Corners), 0.1 mile north of, 10-foot arch culvert, southwest wing, first stone back of arch on level with base; bronze tablet stamped "332 A"	331. 719

SARLES FERRY, NORTHEAST VIA QUAKER SPRINGS, TO STAFFORDS BRIDGE.

Sarles Ferry, opposite, on Champlain Canal, waste weir No. 7, north wing, southeast corner of coping; painted cross in circle (Canal bench mark No. 37 and Deep Waterways bench mark)	103. 195
Quaker Springs, 600 feet west of crossroads, north side of road, in outcrop; bronze tablet stamped "321 A"	320. 234
Schuyler, Staffords Bridge, east end of north abutment, back corner of coping; chiseled square	208. 37

BALD MOUNTAIN, NORTH VIA DURKEETOWN, TO FORT EDWARD.

Durkeetown Church, south side, 10 feet from rear corner, in stone foundation; bronze tablet stamped "171 A"	169. 928

GLENS FALLS QUADRANGLE.

Fort Edward, Argyle Street Canal Bridge, north wing, east abutment, second step, face corner; chiseled cross in circle (Canal bench mark)	141. 56
Fort Edward, Lock No. 15, southeast anchor; chiseled cross in circle (Canal bench mark 79)	148. 52
Fort Edward, high school building, front entrance, in stone pilaster at left side; bronze tablet stamped "145 A"	144. 571

SARATOGA QUADRANGLE.

BALLSTON SPA, VIA FACTORY VILLAGE, TO MIDDLEGROVE.

Factory village, east abutment of bridge over creek; bench mark at southwest corner	354. 48
Rock City Falls, on wall of flume at Pioneer Mills, 50 feet south of track; chisel mark	400. 49
Rock City Falls, southeast corner of mill, 40 feet east of stone bridge; aluminum tablet stamped "445 ALBANY"	445. 760

EAST GALWAY, EAST TO SOUTH GREENFIELD.

East Galway, in east side of foundation wall of Baptist Church; bronze tablet stamped "889 ALBANY"	889. 598
Rock City Falls, 2.5 miles northwest of, near gristmill at Middlegrove; northwest corner of west abutment to iron bridge over Kayaderosseras Creek	523. 56
Middlegrove, in east end of south abutment of iron bridge over Kayaderosseras Creek; bronze tablet stamped "523 ALBANY"	523. 515

HADLEY, SOUTH TO CORINTH (SINGLE-SPUR LINE).

Corinth, in northwest corner of Baptist Church; bronze tablet stamped "626 ALBANY"	626. 057

BROADALBIN QUADRANGLE.

FACTORY VILLAGE, WEST VIA GALWAY AND BROADALBIN, TO MAYFIELD.

	Feet.
Galway, in northwest corner of Presbyterian Church; aluminum tablet stamped "838 ALBANY"	838.450
West Galway, in northwest corner of foundation wall of Presbyterian Church; aluminum tablet stamped "871 ALBANY"	871.942
Broadalbin, in southeast corner of brick Baptist Church; aluminum tablet stamped "820 ALBANY"	820.567

MAYFIELD, EAST VIA NORTHAMPTON TO EAST GALWAY.

Northampton, on southeast corner of retaining wall at south approach to closed wooden bridge; State bench mark (Colvin's), chisel marked "B. M. No. 31"	739.71
Northampton, 2.25 miles south of, on ledge of rock near crest of hill; State bench mark, chisel marked "72"	1,019.87
Northampton, 2.9 miles south of, at intersection of roads, northwest corner, 50 feet north of road; old State bench mark	1,035.00
Hagedorns Mills, south abutment in southeast corner of bridge over creek; bronze tablet stamped "975 ALBANY"	974.824
North Galway, square stone monument 200 feet north of road locally known as Mechanic street; stone chisel marked "N. Y. 17 S. S."	1,266.699

EDINBURG, SOUTH VIA BATCHELLERVILLE TO NORTHAMPTON.

Batchellerville, in southwest corner of Presbyterian Church foundation wall; bronze tablet stamped "771 ALBANY"	770.450
Northampton, 0.36 miles northeast of, west side of road; chisel mark on bowlder (old State bench mark)	774.06
Northampton, 3.1 miles northeast of, on east side of road near yellow house; chisel mark on bowlder (old State bench mark)	799.96
Northampton, in northeast corner of Presbyterian Church; bronze tablet stamped "790 ALBANY"	789.612

EDINBURG, WEST ALONG ROAD, TO NORTHVILLE.

Northville, northeast corner of Methodist Episcopal Church, corner of Main and Washington streets; aluminum tablet stamped "802 ALBANY"	802.292

MAYFIELD, NORTHEAST ALONG RAILROAD, TO NORTHVILLE.

Van Nostrands; road crossing at railroad station	743.0
Cranberry Creek, Main street, 300 feet north of railroad crossing and 100 feet west of track, in bowlder 3 feet high; copper bolt stamped "U. S. G. S. B. M. 768 Ft."	763.790
Northville; platform of railroad station	765.0

LUZERNE QUADRANGLE.

HADLEY, WEST TO DAY, THENCE SOUTH TO EDINBURG.

Hadley, northwest corner of G. West's paper mill; aluminum tablet stamped "613 ALBANY"	613.917
Hadley, 5.75 miles southwest of, 1,500 feet north of road, east side of lower River road leading to Conklingville, on bowlder at intersection; old State bench mark, chiseled "B. M. 11"	628.84
Conklingville, west end of south abutment of iron bridge over Sacandaga River; bronze tablet stamped "726 ALBANY"	726.049

WEST DAY, EAST TO EFNER LAKE (SINGLE-SPUR LINE).

Day Center, 3 miles southeast of, on Lake road, near house owned and occupied by John S. Kinney, in ledge of rock; bronze tablet stamped "1009 ALBANY"	1,009.500

HADLEY, NORTH TO WARRENSBURG, THENCE WEST TO THURMAN.

Luzerne, on stepping stone in front of Catholic Church; chisel mark	665.03
Luzerne, 4.5 miles northeast of, west side of Warrensburg road, 300 feet south of house at edge of woods, in ledge of rocks; bronze tablet stamped "834 ALBANY"	834.025
Warrensburg, on Main street, in southeast corner of stone building used as post-office; bronze tablet stamped "749 ALBANY"	749.022
Thurman station, 1.25 miles north of, in abutment of Bridge No. 13, Adirondack Railway; aluminum tablet stamped "628 ALBANY 1899"	628.264

STONY CREEK TO KNOWLHURST.

Stony Creek, 0.4 mile south of, at northwest corner of steel-girder bridge No. 10 over Stony Creek, in coping stone of bridge seat; aluminum tablet stamped "600 ALBANY 1899"	600.427

HAMILTON AND OTSEGO COUNTIES.

RICHFIELD SPRINGS AND COOPERSTOWN QUADRANGLES.

The elevations in the following lists are based upon the Gristmill bench mark near Albany, the elevation of which is accepted as 13.863 feet above mean sea level. The initial points upon which these levels depend are at Herkimer, Little Falls, and Colliersville, points in the precise-level net, the bench marks at Herkimer and Little Falls having been re-covered by the recent precise leveling of the Army Engineers. The leveling was done under the direction of Mr. A. M. Walker, topographer, by Messrs. A. W. Gill and W. W. Gilbert, levelmen, during the season of 1899. All standard bench marks are stamped with the letters "ALBANY" or "A" in addition to the figures of elevation.

RICHFIELD SPRINGS QUADRANGLE.

MOHAWK, SOUTHEAST TO PAINES HOLLOW, THENCE EAST TO NEWVILLE, THENCE VIA INDIAN CASTLE TO LITTLE FALLS.

	Feet.
Mohawk, 3.9 miles southeast of, Gilbert Day's stable, southwest corner of foundation; aluminum tablet stamped "719 ALBANY"	719.230
Paines Hollow, 0.1 mile west of post-office, southwest corner of Dr. Henry Green's stable; aluminum tablet stamped "1133 ALBANY"	1,133.300
Newville, southeast corner of stone mill belonging to Messrs. Lewis & Spoor; aluminum tablet stamped "552 A"	552.700

PAINES HOLLOW, SOUTH THROUGH JORDANVILLE, TO RICHFIELD SPRINGS.

Richfield Springs, 1 mile northeast of, highway bridge at three corners, at center of east parapet wall, on coping stone; chisel mark	1,329.35
Richfield Springs, northwest corner of Gould avenue and Church street, southeast corner of Universalist Church; aluminum tablet stamped "1327 ALBANY"	1,327.556

RICHFIELD SPRINGS, EAST VIA WARREN, TO EAST SPRINGFIELD.

Springfield Center, foundation of Baptist Church; aluminum tablet stamped "1257 ALBANY"	1,257.736
East Springfield, west side of stone building used as post-office; aluminum tablet stamped "1324 ALBANY"	1,324.721

NEWVILLE, VIA STARKVILLE, TO EAST SPRINGFIELD.

Starkville, Abram De Garno's mill, in wall 1 foot east of northwest corner of building, 4 feet above ground; aluminum tablet stamped "692 ALBANY"	692.500

COOPERSTOWN QUADRANGLE.

SPRINGFIELD CENTER, SOUTH TO COOPERSTOWN.

Cooperstown, northwest corner of county court-house; aluminum tablet stamped "1264 ALBANY"	1,264.480
Cooperstown, opposite Cooperstown and Charlotte Valley railroad station; top of rail, main track	1,283.0

COLLIERSVILLE, ALONG THE DELAWARE AND HUDSON RAILROAD, TO COOPERSTOWN.

Milford, Methodist Church, northeast corner of foundation; aluminum tablet stamped "1207 ALBANY"	1,207.200
Hartwick Seminary building, in foundation, east side; aluminum tablet stamped "1266 ALBANY"	1,266.390
Hartwick Seminary, 1.4 miles north of, iron bridge over river, on capstone at northeast corner; chisel mark	1,179.37

HERKIMER, MADISON, ONEIDA, AND OTSEGO COUNTIES.

HARTWICK, ORISKANY, SANGERFIELD, AND WINFIELD QUADRANGLES.

The elevations in the following list are based upon the heights of bench marks at Earlville, Richfield Junction, and Richfield Springs, as determined in accordance with the 1903 adjustment. For elevations at Richfield Junction and Leonardsville on the Sangerfield quadrangle refer to the precise-level line, Utica to Sidney (pp. 18–19).

The leveling was done in 1904–5 by Mr. G. M. Dimmick, levelman, under the direction of Mr. J. H. Jennings, topographer, except 1905 work on Winfield quadrangle, which was under the direction of Mr. C. C. Bassett, topographer. Standard bench marks are stamped "1903 ADJ" in addition to the figure of elevation. The letters "ALBANY" also were stamped upon those set in 1904.

SANGERFIELD QUADRANGLE.

RICHFIELD JUNCTION, ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, SOUTHWEST VIA WATERVILLE AND NEW BROOKFIELD, TO POOLVILLE.

	Feet.
Paris station, in foundation wall of the residence of J. W. Pugh, east end of north face; bronze tablet stamped "1423 1903 ADJ"	1,423.286
Waterville, 150 feet west of station, in foundation wall of N. C. Bohn & Son's shoe shop, south end of east face; aluminum tablet stamped "1237 ALBANY ADJ"	1,237.417
Sangerfield, 200 feet east of station, in foundation wall of residence of M. L. Williams; bronze tablet stamped "1250 ALBANY 1903 ADJ"	1,250.190
North Brookfield, in foundation wall of Cedar Valley Hotel, north end of west face; aluminum tablet stamped "1201 ALBANY 1903 ADJ"	1,200.680
Hubbardsville. in foundation wall of Hotel Green, east end of north face; bronze tablet stamped "1202 ALBANY 1903 ADJ"	1,202.113

BOUCKVILLE, NORTHEAST ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO DEANSBORO, THENCE SOUTHEAST TO WATERVILLE.

Oriskany Falls, in foundation wall of the store of E. McGlynn, east end of south face; bronze tablet stamped "978 ADJ 1903"	978.320
Deansboro, in foundation wall of the United States milk condensery, east end of south face; bronze tablet stamped "795 ADJ 1903"	795.020
Forge Hollow, 0.51 mile southeast of, in foundation wall of stone schoolhouse, south end of east face; aluminum tablet stamped "987 ADJ 1903"	986.810

RICHFIELD JUNCTION, SOUTH ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO BRIDGEWATER.

Bridgewater, in foundation wall of Congregational Church, north end of east face; bronze tablet stamped "1215 ALBANY 1903 ADJ"	1,215.112

WINFIELD QUADRANGLE.

BRIDGEWATER, EAST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD TO RICHFIELD SPRINGS.

West Winfield, in foundation of railroad public drinking fountain, 50 feet east of station; bronze tablet stamped "1182 ALBANY 1903 ADJ"	1,182.308
East Winfield, 880 feet east of station; top of railroad milepost 298	1,214.16
Cedarville, in foundation wall of station, east end, north face; bronze tablet stamped "1292 ALBANY 1903 ADJ"	1,291.955
Millers Mills, in foundation wall of station, north end, east face; bronze tablet stamped "1410 ALBANY 1903 ADJ"	1,409.826
Millers Mills, 2.64 miles east of; top of milepost 304	1,472.14
South Columbia, in foundation wall of Methodist Church; bronze tablet stamped "1476 ALBANY 1903"	1,476.007
South Columbia, 2.02 miles east of, top of railroad iron milepost 808	1,343.49

NORWICH CORNERS, SOUTHEAST TO MILLERS MILLS.

Jerusalem Hill, in foundation wall of Jerusalem Church, 24 inches above ground; bronze tablet stamped "1532 ADJ 1903"	1,531.843

MILLERS MILLS, NORTHEAST, ALONG HIGHWAY VIA COLUMBIA CENTER, TO MOHAWK.

Columbia Center, 4.16 miles east of Cedarville, in foundation wall of Methodist Church, south end of west face, bronze tablet stamped "1532 ADJ 1903"	1,532.466
Denison Corners, in foundation wall of the residence of A. A. Wolleber, south end of west face; bronze tablet stamped "1315 ADJ 1903"	1,315.560

WEST WINFIELD, SOUTHEAST ALONG HIGHWAY, TO SCHUYLER LAKE.

Plainfield Center, in foundation wall of the Congragational parsonage, west end of south face; bronze tablet stamped "1756 ADJ 1903"	1,755.843
West Exeter, in foundation wall of the store of Denis Harrington, north end of west face; bronze tablet stamped "1320 ADJ 1903"	1,319.866

	Feet.
Exeter, in wall of stone store occupied by P. J. Horan, north end of west face; bronze tablet stamped "1656 ADJ 1903"	1,655.488
Schuyler Lake, in wall of Universalist Church, south end, west face; aluminum tablet stamped "1313 ADJ 1903"	1,312.548

HARTWICK QUADRANGLE.

SCHUYLER LAKE, SOUTHEAST TO COOPERSTOWN.

Oakville, in foundation wall of Hotel Ayres, south end of east face; bronze tablet stamped "1278 ADJ 1903"	1,277.753

ORISKANY QUADRANGLE.

PARIS STATION, NORTH TO PARIS, THENCE EAST TO SAUQUOIT.

Paris, in foundation wall of Episcopal Church, south end of west face; bronze tablet stamped "1497 ADJ 1903"	1,497.371

ALBANY, MONTGOMERY, OTSEGO, AND SCHOHARIE COUNTIES.

BERNE, CANAJOHARIE, AND SCHOHARIE QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. The descriptions are republished from Bulletin No. 185 and the Appendix to the Twentieth Annual Report of the U. S. Geological Survey, with elevations corrected to accord with the latest adjustment. The leveling on the Canajoharie and Schoharie quadrangles was done in 1898, under the direction of Mr. C. C. Bassett, topographer, by Mr. Clark Brown, levelman, and that on the Berne quadrangle was done partly in 1898–9, under the direction of Mr. A. M. Walker, topographer, by Mr. Seth Van Loan, levelman, and finished in 1900 under Mr. Glenn S. Smith, topographer, by Mr. J. H. Hodges, levelman. The standard bench marks are stamped "ALBANY" or "A" in addition to the figures of elevation.

BERNE QUADRANGLE.

DELANSON, SOUTH TO GALLUPVILLE, THENCE SOUTHEAST TO EAST BERNE.

	Feet.
Delanson, in front of station; top of rail	813.0
Gallupville, Dutch Church, in wall near southeast corner; bronze tablet stamped "831 ALBANY"	831.310
Berne, Lutheran Church, in southeast corner; bronze tablet stamped "1015 ALBANY"	1,014.986

BERNE, SOUTHEAST VIA SOUTH BERNE, TO WESTERLO, THENCE NORTH TO EAST BERNE.

Westerlo, bridge over creek, in top of south end of east abutment; bronze tablet stamped "1144 ALBANY"	1,144.094
East Berne, west entrance to village, 300 feet east of Berne road intersection, in embedded stone at bend in road; bronze tablet stamped "1174 ALBANY"	1,174.310

EAST BERNE, NORTH TO ALTAMONT, THENCE NORTHWEST ALONG THE DELAWARE AND HUDSON RAILROAD, TO DELANSON.

Altamont, in foundation wall southwest side of Altamont Hotel; bronze tablet stamped "464 ALBANY"	464.780
Knox, 1.75 miles west of station, 900 feet west of road crossing, small culvert; point on north end, chiseled circle	771.86
Duane, 900 feet east of, south end of east abutment of bridge; point on top	894.94

WESTERLO, WEST TO RENSSELAERVILLE.

Rensselaerville, southwest corner Miner's storehouse, in stone sill; bronze tablet stamped "1367 ALBANY"[a]	1,369.568

CANAJOHARIE QUADRANGLE.

CANAJOHARIE TO AMES (MEAN OF DIRECT AND REVERSE LINES).

Canajoharie, Union Free School, west front, south of stone steps, in stone balustrade; aluminum tablet stamped "A 350"	350.301
Marshville, schoolhouse; south end of doorsill	675.72

[a] This elevation, 1,369.568, is possibly 2 feet too great.

AMES, EAST TO BLAINE, THENCE SOUTH TO SHARON.

	Feet.
Blaine, 50 feet from east coping of cemetery wall; aluminum tablet stamped "A 943"	943.315
Sharon, opposite Lutheran Church and schoolhouse, outcropping ledge in field, southwest of road; aluminum tablet stamped "A 1212"	1,212.822

SHARON, NORTHWEST TO SHARON SPRINGS STATION.

Sharon Center, schoolhouse; north end of doorsill	1,437.77
Sharon Springs, 700 feet north of main east and west road through Rockville, 500 feet from top of hill, in outcrop on west side of street; aluminum tablet stamped "A, 1295"	1,295.007
Sharon Springs, in front of station; top of rail	1,353.7

SHARON SPRINGS STATION, NORTHWEST TO SPROUT BROOK, THENCE EAST TO AMES.

Sprout Brook, 1 mile south of, at road corner; south end of schoolhouse doorsill	783.73
Hessville, 0.5 mile south of schoolhouse, 150 feet north of road to west, opposite house and 15 feet east of road, in bowlder 8 feet broad; aluminum tablet stamped "A 826"	825.987

FORT PLAIN, WEST TO HALLSVILLE.

Fort Plain, Erie Canal Lock No. 32, towpath coping, end of anchor, northeast gate; chiseled cross within circle (Canal B. M. No. 171)	312.151
Fort Plain, Union Free School, Division street front, water table 1 foot from south corner; aluminum tablet stamped "A 316"	317.090
Fort Plain, 1.5 miles west of, Valley schoolhouse; west end of doorsill	394.53
Hallsville, south end of cheese factory, stone foundation, 1 foot from east corner; aluminum tablet stamped "A 509"	509.242

SCHOHARIE QUADRANGLE.

Shutts Corners, schoolhouse; east end of doorsill	1,145.97
Barnerville, 200 feet west of covered bridge, 100 feet north of Main street, at iron bridge over mill race, south abutment, east wing; aluminum tablet stamped "A 827"	827.253

BARNERVILLE, EAST TO SCHOHARIE, THENCE SOUTH TO MIDDLEBURG.

Schoharie, court-house, south side of south door in west front, beveled jamb; aluminum tablet stamped "A 611"	611.077
Schoharie, 1.25 miles south of Bridge street, on railroad bridge, north abutment, west wing, second step; domelike fossil 6 inches from face	609.43
Middleburg, schoolhouse, east front, south of entrance, in foundation wall; aluminum tablet stamped "A 649"	649.551
Breakabeen, Lutheran Church, in west foundation, 5 feet from corner; aluminum tablet stamped "A 754"	754.323
West Fulton, iron bridge across Panther Creek, south abutment, east end, in coping; aluminum tablet stamped "A 1156"	1,157.150
Vintonton, 0.25 mile south of, schoolhouse; south end of doorsill	1,390.44

MIDDLEBURG, SOUTH TO FRANKLINTON.

Middleburg, 1.75 miles southeast of, iron bridge, north abutment, east wing, on bridge seat; chiseled square	743.47
Franklinton, schoolhouse, southwest corner of foundation; aluminum tablet stamped "A 1215"	1,214.907

DUTCHESS, ORANGE, AND ULSTER COUNTIES.

NEWBURG, POUGHKEEPSIE, RHINEBECK, ROSENDALE, AND SCHUNEMUNK QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. The descriptions are republished from Bulletin No. 185, with elevations corrected to accord with the 1903 adjustment. For additional elevations on Newburg and Poughkeepsie quadrangles refer to "Precise leveling."

The leveling on Rosendale quadrangle was done partly in 1900 under Mr. C. C. Bassett, topographer, by Mr. W. S. D. Moore, levelman, and completed in 1901 under the direction of Mr. J. H. Jennings by W. E. Greene, levelman. The remainder was done under Mr. C. C. Bassett, topographer, as follows: On Schunemunk and Poughkeepsie quadrangles and on part of Rhinebeck quadrangles in 1899 by Mr. Seth Van Loan, levelman; on Newburg quad-

rangle in 1900 by Mr. G. Bailey, levelman; on remainder of Rhinebeck in 1900 by Mr. W. S. D. Moore, levelman. The standard bench marks are stamped with letters "ALBANY" in addition to figures of elevation. Those on the Schunemunk quadrangle are stamped mostly 2 feet too low.

POUGHKEEPSIE QUADRANGLE.

POUGHKEEPSIE, NORTHEAST TO PLEASANT VALLEY.

	Feet.
Poughkeepsie station, second step from east end of column on north side of arch bridge, keyed in fifth stone above ground; brass bolt stamped "+"	43.334
Poughkeepsie, city hall, in front face; aluminum tablet stamped "ALBANY 173"	172.991
Poughkeepsie, south end of first bridge east of station, over small creek; point on corner first step, east abutment	172.94
Poughkeepsie, northwest end of west abutment of small bridge east of Van Wagner crossing; point on top of stone	243.21
Poughkeepsie, 1 mile west of Pleasant Valley, at Landis place, third step from top, south end, west abutment, cattle pass and bridge; point in corner	232.57
Pleasant Valley, 300 feet east of station, in face of rock north side of track; bronze tablet stamped "ALBANY 211"	211.416

HIGHLAND, SOUTH ALONG THE ERIE RAILROAD, TO MILTON.

Milton, south side of Townsend's store, in window sill; bronze tablet stamped "9 ALBANY"	9.000

HIGHLAND, NORTH TO COLLEGE POINT.

Highland, Poughkeepsie bridge, west abutment, southwest corner, top stone; chiseled mark.	225.31
Highland, in front of West Shore Railroad station; top of west rail	10.2
Highland, 2 miles north of, east end of south wall of open culvert; chiseled mark	8.90

RHINEBECK QUADRANGLE.

PLEASANT VALLEY, NORTHEAST TO CLINTON CORNERS, THENCE SOUTH TO WASHINGTON HOLLOW.

Salt Point, 1 mile east of, south end of west abutment of Leggetts Bridge; corner second stone from top	267.31
Clinton Corners, north end of west abutment of bridge over Salt Point Creek, in coping stone; bronze tablet stamped "ALBANY 244"	244.735
Hibernia, south abutment, near end of truss bridge over creek; point on east side	251.43

COLLEGE POINT, NORTH ALONG THE WEST SHORE RAILROAD, TO KINGSTON.

College Point, 180 feet north of "Watchman's Box," on east end of north wall of culvert; chisel mark	65.42
West Park, West Shore Railroad station, in north wall at northwest corner; bronze tablet stamped "113 ALBANY"	113.842
Esopus, at crossing; top of rail	117.3
Esopus, 0.7 mile north of, south abutment, on east end of bridge; chiseled mark	122.16
Ulster Park, 300 feet south of station, at crossing; top of rail	149.7
Port Ewen, 500 feet south of station, at crossing; top of east rail	160

ROSENDALE QUADRANGLE.

KINGSTON, WEST ALONG THE ULSTER AND DELAWARE RAILROAD, TO BRODHEAD.

Kingston, city hall; in center of face wall of front portico; aluminum tablet stamped "223 ALBANY"	223.760
Bridge No. 6, Ulster and Delaware Railroad, east abutment, north end, on top stone; chisel mark	155.94
Kingston Creek Bridge, on north end of west abutment; chisel mark	165.01
Stony Hollow, 0.25 mile north of, Bridge No. 12, east abutment, south end, top stone; chisel mark	459.34
West Hurley, 0.5 mile east of railroad station, 100 feet northwest of road crossing on south side of highway; bronze tablet stamped "546 ALBANY"	546.312
West Hurley, in front of station; top of rail	531
Olive Branch, in front of station; top of rail	515.2
Olive Branch, 400 feet west of station, Bridge No. 17, west abutment, north end, top stone; chisel mark	512.22
Olive Branch, 2.5 miles west of, Bridge No. 20, east abutment, south end, top stone; chisel *mark*	506.37
Brodhead Bridge, east abutment, north end; chisel mark	502.21
Brodhead, at Ulster and Delaware Railroad crossing; top of rail	503.4

SHOKAN, SOUTHEAST ALONG PUBLIC ROAD, TO ALLIGERVILLE.

	Feet.
Krumville, 1.5 miles southeast of, at L. D. Christiana's house, in northeast corner of foundation wall; bronze tablet stamped "827 ALBANY 1902"	827.287

ALLIGERVILLE, NORTHEAST VIA ROSENDALE, TO RIFTON.

Alligerville, iron bridge over Rondout Creek, east end of south abutment; bronze tablet stamped "220 ALBANY 1901"	220.405
Rosendale, road crossing at station; top of rail	182.5
Rifton, 150 feet from post-office, east side of road, rock ledge; bronze tablet stamped "170 ALBANY 1901"	169.887

ROSENDALE, SOUTH ALONG THE WALLKILL VALLEY RAILROAD, TO NEWPALTZ.

Springtown, farm crossing at station; top of rail	188.4
Newpaltz, 150 feet north of station, at road crossing; top of rail	207.5

ROSENDALE, ALONG THE WALLKILL VALLEY RAILROAD, TO KINGSTON.

Binnewater, road crossing; top of rail	206.1
Whiteport, in front of station; top of rail	180.4

NEWBURG QUADRANGLE.

NEWBURG, WEST VIA COLDENHAM TO MONTGOMERY, THENCE NORTH TO NEW HURLEY STATION.

Newburg, southwest corner of post-office building, to right of entrance; aluminum tablet stamped "95"	94.404
Coldenham, 0.2 mile west of, at entrance to A. B. Lindsay's place, large stone gatepost; aluminum tablet stamped "ALBANY 434"	433.619
Berea, crossing of Philadelphia and Reading Railroad; top of west rail of main track	410.3
Walden, southeast corner of National Bank of Walden; aluminum tablet stamped "ALBANY 376"	375.136
Walden, in front of Wallkill Valley Railroad station; top of west rail, main track	353.2
Borden condensed-milk factory, on west end of culvert over stream flowing into pond, stone on southeast corner of coping; chisel mark	292.52
Wallkill, 400 feet south of station, at highway crossing; top of rail	279.1
Wallkill, foundation of water tank; point cut on stone	279.13

NEW HURLEY POST-OFFICE, SOUTHEAST VIA PLATTEKILL AND BALMVILLE, TO NEWBURG.

Plattekill, 0.2 mile east of, north end of bridge over stream flowing south, on top stone of retaining wall; chisel mark	554.15
Balmville, on stone foundation of fence surrounding big tree; chiseled point	194.60

NEW HURLEY STATION, NORTH VIA GARDINER TO NEWPALTZ, THENCE EAST TO HIGHLANDS.

Gardiner station, 150 feet south of, in east wall of culvert; bronze tablet stamped "ALBANY 309"	308.097
Forest Glen station, 0.2 mile south of, south end of trestle, east side of track, on wall; chisel mark	297.73
Newpaltz, Newpaltz Savings Bank, southwest corner; bronze tablet stamped "ALBANY 237"	236.022
Lloyd, Centerville Hotel, southeast corner; bronze tablet stamped "ALBANY 359"	358.177

LLOYD, SOUTHWEST TO CLINTONDALE.

Clintondale, Ambrose's store, southwest corner; bronze tablet stamped "ALBANY 553"	552.740

SCHUNEMUNK QUADRANGLE.

CORNWALL, VIA NEWBURG JUNCTION ALONG THE ERIE RAILROAD, TO OXFORD.

Cornwall, 600 feet north of, New York, Ontario and Western Railway bridge, in face of west abutment; bronze tablet stamped "ALBANY 271"	273.714
Mountainville, 0.5 mile north of, west end of south abutment of railroad bridge; point on bridge seat	229.58
Woodbury, 200 feet south of station; point on northeast foot block at end of truss bridge	435.90
Central Valley, 200 feet north of station, south abutment, east end bridge seat; point on stone	484.20
Central Valley, west of Noxon's store, in large stone in retaining wall of Finken's place; bronze tablet stamped "ALBANY 488"	489.334

	Feet.
Newburg Junction, 0.5 mile north of, east end of south abutment of railroad bridge; point on bridge seat	518.22
Arden, 300 feet north of, north abutment of bridge over stream; point on top, east end, chisel mark	522.16
Arden, 300 feet north of station, railroad bridge over stream, in pier top, east end; bronze tablet stamped "ALBANY 519"	520.695
Doyles, 0.25 mile east of, face of large bowlder in road; bronze tablet stamped "ALBANY 718"	719.921
Turners, 300 feet west of, west abutment of bridge, on north end; chisel mark	554.78
Monroe, 0.5 mile east of, west abutment of culvert; point on top of north end	592.32
Oxford, 300 feet east of, east abutment of overhead bridge; point on north end	531.92

OXFORD, NORTH TO BURNSIDE, THENCE EAST TO CORNWALL.

Craigville, 300 feet north of, south abutment, east end of cattle pass; point second step from top	423.42
Farmingdale, 500 feet north of, south abutment, east end of cattle pass; point on top	379.27
Elsmere, 0.5 mile south of, west end of north abutment of cattle pass; point on second step from top	372.80
Burnside, 1.25 miles east of, in west face of east abutment of concrete-arch railroad bridge No. 35; bronze tablet[a] stamped "359 ALBANY"	358.823
Meadowbrook, 400 feet east of; point on north end of east abutment of culvert	337.2
Cornwall, 0.4 mile east of, south abutment of Erie Railroad bridge; point on coping at west end	338.34
Cornwall, west abutment of New York, Ontario and Western Railway bridge; point on step, north end	271.82

COLUMBIA AND DUTCHESS COUNTIES.

CATSKILL, CLOVE, COPAKE, COXSACKIE, KINDERHOOK, AND MILLBROOK QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. The descriptions are mostly republished from Bulletin No. 185, and the elevations are corrected to accord with the latest adjustment.

The leveling on Millbrook quadrangle was done in 1899 under the direction of Mr. C. C. Bassett, topographer, by Mr. Seth Van Loan, levelman; that on Catskill, Kinderhook, and part of Copake quadrangles was done in 1900 under Mr. Bassett, by Mr. George Bailey, levelman; the remainder on Copake quadrangle was done in 1902 under Mr. A. H. Bumstead, topographer, by Mr. G. C. Mills, levelman. The standard bench marks are stamped with letters "ALBANY" in addition to the figures of elevation.

CLOVE QUADRANGLE.

	Feet.
Dover Plains, in northwest corner of bank; aluminum (?) tablet stamped "ALBANY 406".	406.566

MILLBROOK QUADRANGLE.

WASHINGTON HOLLOW, EAST VIA MILLBROOK, TO DOVER PLAINS.

Millbrook, 2 miles west of, south parapet wall of bridge over stream; point in stone	459.56
Millbrook, west side of Millbrook Bank near southwest corner; aluminum tablet stamped "ALBANY 568"	568.824

DOVER PLAINS, NORTH ALONG THE HARLEM RAILROAD, TO MILLERTON.

Wassaic, 600 feet south of, north abutment of bridge over stream; point on west end	453.13
Amenia, in corner stone southwest corner of Amenia Bank; aluminum tablet stamped 'ALBANY 573"	573.87
Coleman, 0.87 mile north of, west end of north abutment overhead bridge; point on second step from top	586.68
Millerton, first bridge north of, south abutment, west end; point on second stone from top.	499.56

[a] This bench mark was set in 1905 by Mr. C. E. Knickerbocker, engineer maintenance of way, New York, Ontario and Western Railway, and replaces the old bench mark stamped "357" which is at the same elevation but incased in concrete reenforcement of abutment.

MILLERTON, VIA SHEKOMEKO ALONG THE NEWBURG, DUTCHESS, AND CONNECTICUT RAILROAD, TO PINE PLAINS.

	Feet.
Millerton, in northeast front of brick block hotel; aluminum tablet stamped "ALBANY 701"	701.081
Winchells station, 1.25 miles west of, south abutment of cattle pass Bridge No. 66; point on east end	864.73
Shekomeko, 1 mile north of, south abutment of overhead Bridge No. 63; point on fourth step from top, west end	731.87
Bethel station, west abutment of Bridge No. 57; point on north end, chisel mark "U. S."	500.79
Pine Plains, in foundation stone of Myer's dwelling, near southeast corner of house; aluminum tablet stamped "ALBANY 474"	474.626

PINE PLAINS, VIA STISSING AND STANFORDVILLE, TO CLINTON CORNERS.

McIntyre, Central New England bridge, in face of south abutment, third course from ground; aluminum tablet stamped "ALBANY 399'	399.388

COPAKE QUADRANGLE.

MILLERTON, NORTH ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO PHILMONT.

Mount Riga station, 1.5 miles north of, stream to west; northwest corner of culvert (stream 3 feet lower)	773.43
Boston Corners, 300 feet south of station, in top of southeast corner of culvert on New York Central Railroad; bronze tablet stamped "ALBANY 727"	727.139
Copake Ironworks, 500 feet south of station; northwest abutment of railroad bridge (stream 25 feet below)	674.33
Craryville, 500 feet west of station, south side of track, in west abutment of railroad bridge; bronze tablet stamped "ALBANY 635"	635.151
Martindale station, just north of, at crossing, west rail	639.5

BOSTON CORNERS, WESTWARD VIA THE CENTRAL NEW ENGLAND RAILWAY, TO GALLATINVILLE, THENCE NORTH ALONG HIGHWAYS VIA GLENCO MILLS, TO CLAVERACK, THENCE NORTHEAST TO PHILMONT.

Boston Corners, 300 feet south of station, in top of southeast corner of culvert on New York Central Railroad; bronze tablet stamped "ALBANY 727"	727.139
Copake, Central New England bridge No. 80, on north end of west abutment; chiseled square.	537.69
Copake, 2.5 miles southwest of, Bridge No. 85, 900 feet southeast of highway and 0.5 mile southeast of Millers Pond, in east corner of southwest abutment; bronze tablet stamped "ALBANY 508"	508.350
Ancram, stone-arch highway bridge over Roeliff Janson Kill, on south end of west parapet; chiseled square	480.76
Gallatinville, highway bridge over Roeliff Janson Kill, east wing of north abutment; aluminum tablet stamped "405 ALBANY"	405.192
New Forge, on south end of west abutment of iron bridge over Claverack Creek; bronze tablet stamped "516 ALBANY"	515,995
West Taghkanick, 0.9 miles north of, 600 feet south of Geo. Sears's dwelling; 1-inch steel bar 15 inches long sunk flush in rock ledge on west side of road, marked "U. S. B. M. 289"	289.61
Glenco Mills, iron highway bridge over Taghkanick Creek, in west wing wall of south abutment; aluminum tablet stamped "261 ALBANY"	261.703
Claverack, 0.5 miles southeast of, iron highway bridge, center pier, east end; bronze tablet stamped "156 ALBANY"	155.841

KINDERHOOK QUADRANGLE.

PHILMONT, NORTH TO CHATHAM.

Philmont, west side of Empire House, in stone over cellar window; bronze tablet stamped "ALBANY 525"	525.504
Ghent, just south of New York Central Railroad station, at crossing; east rail, east track	397.3
Chatham, east side of tenth roof support from east end of station, train side; tablet (bench mark of the Massachusetts topographical survey commission)	470.912
Chatham, in northeast corner of Masonic Block, about 3 feet from ground; aluminum tablet stamped "ALBANY 470"	470.990
Chatham, 1 mile north of, on west abutment of Bridge No. 201, in top stone; bench No. 84 of the Massachusetts topographical survey commission, marked by a hole and "B. S.", bottom of hole	519.457

NIVERVILLE, SOUTHWEST VIA STUYVESANT FALLS, TO HUDSON.

	Feet.
Niverville, near northwest corner of water tank, in brick about 4 feet from ground; bench mark of the Massachusetts topographical survey commission, marked "B-O-M", center of hole	322.936
Niverville, in southwest corner of brick water tank, 3 feet from ground; bronze tablet stamped "ALBANY 323"	322.924
Valatie, road crossing; west rail	245
Kinderhook, 100 feet south of station, north side of highway, 10 feet west of track; top stone over drain	259.02
Stuyvesant Falls, west end of bridge over Kinderhook Creek, in end of north wing wall; bronze tablet stamped "ALBANY 156"	156.376
Rossman station, road crossing 100 feet south of; east rail	63.6
Stockport, road crossing just north of station; west rail	47.0
Stottville, 150 feet north of station, road crossing; east rail	125.4

CATSKILL QUADRANGLE.

Hudson, on northeast end of upper station, 1 foot from ground; bronze tablet stamped "ALBANY 151"	151.543
Hudson, Diamond street; crossing electric railway and railroad	151.1

COXSACKIE QUADRANGLE.

Hudson station; United States Coast and Geodetic Survey bench mark No. 4 (railroad bench, the usual round-headed bolt, in west side of top of stone pier under iron column, under overhead bridge in street leading to docks and Athens Ferry; the first one north of Hudson station. The pier is under the second column from south end in the east row of three)	10,686

GREENE, ULSTER, AND SCHOHARIE COUNTIES.

GILBOA, KAATERSKILL, AND PHOENICIA QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark near Albany, the elevation of which is now accepted as 13.863 feet above mean sea level. The leveling was previously reported upon in Bulletin No. 185, but has been readjusted to accord with the 1903 adjustment of precise leveling. The leveling was done in 1900, under the direction of Mr. C. C. Bassett, topographer, by Messrs. W. S. D. Moore and George Bailey, levelmen. The standard bench marks are stamped "ALBANY" in addition to the figures of elevation.

PHOENICIA QUADRANGLE.

BOICEVILLE, NORTH TO PHOENECIA.

	Feet.
Mount Pleasant, in front of station; top of rail	713.9
Phoenicia, in front of station; top of rail	796.2
Phoenicia, Ulster and Delaware Railroad bridge, south pier, top of east end; aluminum tablet stamped "804 ALBANY"	805.171

PHOENICIA, NORTHWEST ALONG THE ULSTER AND DELAWARE RAILROAD, TO HIGHMOUNT.

Shandaken, steel bridge at forks of road, top of southwest wing wall; bronze tablet stamped "ALBANY 1071"	1,071.401
Big Indian, at station; passenger-room doorsill	1,213.85
Pine Hill, in front of station; top of rail	1,661.2

SHANDAKEN, SOUTHWEST TO BIG INDIAN, THENCE SOUTH TO SLIDE MOUNTAIN POST-OFFICE.

Slide Mountain, rock at northwest corner of post-office; bronze tablet stamped "ALBANY 1665"	1,665.070

SHANDAKEN, NORTH TO LEXINGTON.

West Kill, 1.3 miles south of top of Deep Notch, west side of road, on bowlder; aluminum tablet stamped "ALBANY 1901"	1,901.096
West Kill, small steel bridge on south of road, east sill; chisel mark	1,464.51

PHOENICIA, NORTHEAST TO LANESVILLE.

Chichester, in front of station; top of rail	1,014.7
Chichester, 1.7 miles northeast of, north abutment of bridge, east end, top stone; chisel mark.	1,151.45

HUNTER, WEST TO LEXINGTON.

	Feet.
Jewett Center, east abutment of East Kill bridge, north end, top stone; aluminum tablet stamped "1405 ALBANY"	1,405.728
Lexington, north pier of Schoharie Creek bridge, west end, top stone; aluminum tablet stamped "1329 ALBANY"	1,329.760

KAATERSKILL QUADRANGLE.

LANESVILLE, NORTHEAST TO KAATERSKILL JUNCTION, THENCE NORTHWEST TO HUNTER.

Edgewood, 300 feet north of station, north pier of bridge, east end, in top stone; bronze tablet stamped "1790 ALBANY"	1,790.606
Hunter, 1 mile south of, east abutment of highway bridge, south end, top of stone; chisel mark	1,620.17
Hunter, public school building, north side of front entrance, in foundation wall; aluminum tablet stamped "1602 ALBANY"	1,602.562

GILBOA QUADRANGLE.

LEXINGTON, NORTH TO PRATTSVILLE.

Lexington, 2.5 miles north of, north abutment of Schoharie Creek Bridge, east end, top stone; chisel mark	1,275.76
Prattsville, 1 mile east of, east abutment of Red Kill Bridge, south end, top stone; chisel mark.	1,181.18
Prattsville, public school building, in front wall; aluminum tablet stamped "1164 ALBANY"	1,164.638

PRATTSVILLE, EAST TO WINDHAM.

Windham, bridge over Batavia Creek on road to Hunter, top of north abutment, east end; bronze tablet stamped "1517 ALBANY"	1,517.884

PRATTSVILLE, NORTH TO GILBOA.

Prattsville, at fork with Grand Gorge road, Schoharie Creek Bridge, east approach, top stone of north retaining wall at end of railing; chisel mark	1,151.04
Gilboa, 1.2 miles south of, south abutment of Manor Kill Bridge, east end, top stone; chisel mark	1,115.65
Gilboa, 800 feet north of, on east side of road, opposite bridge over Schoharie Creek, in ledge of rock; bronze tablet stamped "1010 ALBANY"	1,010.190

GILBOA, EAST TO MANORKILL.

Strykersville (West Conesville post-office), bridge 40 feet west of post-office, on southwest abutment; chisel mark	1,260.12
Conesville, bridge 150 feet west of post-office, on northeast corner abutment; chisel mark...	1,383.23
Manorkill, white church opposite post-office, southeast corner; bronze tablet stamped "ALBANY 1515"	1,515.295

GILBOA, NORTH VIA BLENHEIM, TO BREAKABEEN.

Blenheim, 300 feet north of post-office, northwest side of road, in ledge of rock; aluminum tablet stamped "813 ALBANY"	813.430

FRANKLINTON, SOUTH TO LIVINGSTONVILLE.

Livingstonville, in northwest corner of Methodist Church; bronze tablet stamped "ALBANY 1077"	1,077.310

DELAWARE, OTSEGO, SCHOHARIE, AND ULSTER COUNTIES.

HOBART, MARGARETVILLE, AND RICHMONDVILLE QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark, the elevation of which is accepted as 13,863 feet above mean sea level. They result from joint adjustment with previous work to accord with elevations by the 1903 adjustment at Poughkeepsie and East Worcester, points in the precise-level net.

The leveling on Hobart and part of that on Margaretville and Richmondville quadrangles was done in 1901 under the direction of Mr. J. H. Jennings, topographer, by Mr. William Kelley, levelman; the remainder on the Margaretville quadrangle was done by W. E. Greene, levelman, in 1901, under Mr. Jennings, and that on the Richmondville quadrangle in 1902 under Mr. C. C. Bassett, topographer. The standard bench marks are stamped with the letters "ALBANY" in addition to the figures of elevation

MARGARETVILLE QUADRANGLE.

HIGHMONT, EAST ALONG THE ULSTER AND DELAWARE RAILROAD, TO FLEISCHMANS, THENCE NORTH TO ROXBURY.

	Feet.
Shandaken, steel bridge at forks of road, top of southwest wing wall; bronze tablet stamped "1071 ALBANY"	1,071. 401
Big Indian, passenger room at station; doorsill	1,213. 85
Pine Hill, in front of station; top of rail	1,661. 2
Fleischmans station, east abutment of Ulster and Delaware bridge No. 47, south end; aluminum tablet stamped "1515 ALBANY 1901"	1,515. 77
Kelleys Corners, in front of station; top of west rail	1,380. 7
Halcottsville, in front of station; top of west rail	1,403. 8
Halcottsville, 550 feet south of, Ulster and Delaware bridge No. 54, on top of south abutment, at west end; bronze tablet stamped "1399 ALBANY 1901"	1,399. 691
Halcottsville, 1.45 miles north of, at highway crossing; crest of dam	1,410. 8

ARKVILLE, SOUTHEAST ALONG PUBLIC ROAD TO WEST SHANDAKEN.

Dry Brook, West Shandaken, front of Second Adventist Church, southwest corner; bronze tablet stamped "1628 ALBANY 1901"	1,628. 726

ARKVILLE, SOUTHWEST ALONG HIGHWAY TO ARENA, THENCE SOUTHEAST TO GRANT MILLS, THENCE SOUTH TO ULSTER-DELAWARE COUNTY LINE ON COYKENDALL ROAD.

Margaretville, stone steps at entrance to People's Bank, west face; aluminum tablet stamped "1325 ALBANY 1901"	1,325. 581
Grant Mills, 2.9 miles south of, line between Delaware and Ulster counties, 1,380 feet northwesterly from large culvert, north side of Coykendall road, in large rock; bronze tablet stamped "2464 ALBANY 1901"	2,465. 526

NEAR DUNRAVEN, NORTH TO NEW KINGSTON.

New Kingston, north face of United Presbyterian Church, 2 feet west of belfry tower; aluminum tablet stamped "1685 ALBANY 1901"	1,685. 745

HOBART QUADRANGLE.

ROXBURY, NORTHEAST ALONG ULSTER AND DELAWARE RAILROAD TO GRAND GORGE, THENCE WEST TO HOBART.

Roxbury, in front of station; top of west rail	1,495. 1
Roxbury, 0.85 mile north of, north abutment of Ulster and Delaware bridge No. 59, west end; aluminum tablet stamped "1499 ALBANY 1901"	1,499. 601
Grand Gorge station; platform	1,562. 6
Grand Gorge, 125 feet east of main track and 100 feet north of station, top of large bowlder; aluminum tablet stamped "1561 ALBANY 1901"	1,561. 901
South Gilboa station, under overhead bridge; top of west rail	1,748. 8
Stamford, in front of station; top of south rail, main track	1,788. 7
Hobart, 0.25 mile east of, west abutment of Bridge No. 70, south end of back wall; aluminum tablet stamped "1633 ALBANY 1901"	1,634. 701
Hobart, in front of station; top of north rail	1,636. 0

STAMFORD, NORTHWEST ALONG HIGHWAYS TO NORTH KORTRIGHT, THENCE NORTHEAST TO NORTH HARPERSFIELD.

Stamford, Joseph Millan's brick store on Main street, in northwest face; aluminum tablet stamped "1826 ALBANY 1901"	1,827. 244
North Kortright, front of post-office, south side of road; spike in pine tree	1,517. 43
North Harpersfield, southerly side of residence of Jas. A. Topping, under bay window, in foundation wall; bronze tablet stamped "1609 ALBANY 1901"	1,610. 221

RICHMONDVILLE QUADRANGLE.

NORTH KORTRIGHT, NORTHWEST TO FERGUSONVILLE, THENCE NORTHEAST TO CHARLOTTEVILLE, THENCE NORTH TO EAST WORCESTER.

South Worcester, 6 feet north of southeast corner of Olmstead & Sturges's store, east side of foundation wall; aluminum tablet stamped "1373 ALBANY 1901"	1,374. 016
East Worcester, in front of station; top of east rail	1,427. 63
East Worcester, 0.75 mile west of station (precise line), north end of culvert; tablet stamped "1406 ALBANY 1901"	1,405. 207

CHARLOTTESVILLE, NORTHEAST TO SUMMIT, THENCE SOUTH TO STEWART POST-OFFICE (SINGLE-SPUR LINE).

	Feet.
Summit, south side wall of Jump & Havens's drug store; bronze tablet stamped "2108 ALBANY 1902"	2,108.96
Stewart, in southeast corner of post-office (Martin Vroman's house); bronze tablet stamped "1364 ALBANY 1902"	1,364.230

COBLESKILL, NORTHWEST ALONG THE CHERRY VALLEY BRANCH OF DELAWARE AND HUDSON RAILROAD, VIA HYNDSVILLE AND SEWARD, TO SHARON SPRINGS.

Hyndsville, in front of passenger room; top of high rail	1,115.6
Seward, in front of passenger-room door; top of rail	1,181.5
Seward, in front wall of general store; bronze tablet stamped "1186 ALBANY 1902"	1,186.486
Hansons crossing; top of rail	1,217.0

SEWARD, WEST ALONG PUBLIC ROAD TO SOUTH VALLEY (SINGLE-SPUR LINE).

South Valley, Christian Church; bronze tablet stamped "1563 ALBANY 1902"	1,563.183

ORANGE, SULLIVAN, AND ULSTER COUNTIES.

ELLENVILLE AND SLIDE MOUNTAIN QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark at Greenbush near Albany, the elevation of which is accepted as 13.863 feet above mean sea level. The initial elevation at Shokan was determined by readjustment of levels reported upon in Bulletin No. 185. The elevations accord with the 1903 adjustment.

The leveling was done under the direction of Mr. C. C. Bassett, topographer, in 1903, by Mr. G. M. Dimmick, levelman, except line Shokan to Boiceville run in 1900 by Mr. W. S. D. Moore, levelman. Standard bench marks of this list are stamped with the letters "ALBANY" in addition to the figures of elevation and year.

SLIDE MOUNTAIN QUADRANGLE.

BRODHEAD NORTHWEST TO BOICEVILLE.

	Feet.
Okan, 0.2 mile east of station, west abutment of Bridge No. 22, north end, bedplate; bronze tablet stamped "532 ALBANY"	533.351

SHOKAN TO OLIVE CITY, THENCE SOUTHWEST ALONG HIGHWAY TO SAMSONVILLE, THENCE SOUTH TO KERHONKSON, THENCE ALONG RAILROAD SOUTHWEST TO NAPANOCH.

Samsonville, 50 feet south of Methodist Church, in limestone outcrop; bronze tablet stamped "855 ALBANY 1903"	855.411
Kerhonkson, in water table at center of east face of New York, Ontario and Western depot; aluminum tablet stamped "254 ALBANY 1903"	253.760

NAPANOCH, NORTHWEST ALONG HIGHWAY TO EUREKA, THENCE NORTHEAST TO SUNDOWN (SINGLE-SPUR LINE).

Lackawack, 0.3 mile northwest of, in foundation wall of Methodist Church, east face, 5 feet from southeast corner; bronze tablet stamped "691 ALBANY 1903"	691.304
Lackawack, 3.61 miles northwest of, highway bridge over small stream; point on top of west end of south abutment	760.32
Sundown, in foundation wall of Methodist Church, north end of west face; bronze tablet stamped "993 ALBANY 1903"	993.485

POINT WEST OF SUNDOWN, NORTH ALONG HIGHWAY TO DENNING (SINGLE-SPUR LINE).

Denning, in foundation wall of Hotel Erts, east end of south face; aluminum tablet stamped "1965 ALBANY 1903"	1,964.941

ELLENVILLE QUADRANGLE.

NAPANOCH, SOUTH ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY VIA SUMMITVILLE TO MIDDLETOWN.

Ellenville, in foundation wall of station, center of east face; aluminum tablet stamped "319 ALBANY 1903"	319.518
Spring Glen, in foundation wall of station, center of west face; bronze tablet stamped "451 ALBANY 1903"	451.361

	Feet.
Summitville, 150 feet north of station, north end of west retaining wall; point on top of stone sluiceway, square	546.44
Wurtsboro (Mamakating station), in foundation wall of station, north end of east face; bronze tablet stamped "723 ALBANY 1903"	722.782
Bloomingburg, 0.6 mile south of, south end of east abutment of railroad bridge; point on top	713.53
Winterton, in front of station; top of east rail	598.7
Fair Oaks, in front of station; top of east rail	641.2
Crawford Junction, south end of east retaining wall of small culvert 60 feet south of station; point on top	591.93

CRAWFORD JUNCTION, NORTHEAST ALONG ERIE BRANCH TO PINE BUSH, THENCE TO DWAARKILL (SINGLE-SPUR LINE).

Circleville, 150 feet south of station, at highway crossing; top of east rail	621.8
Bullville, at highway crossing south of station; top of east rail	508.9
Bullville, in foundation wall of Methodist Church, north end of east face; aluminum tablet stamped "518 ALBANY 1903"	517.840
Thompson Ridge, 60 feet south of station, highway crossing; top of east rail	459.4
Pine Bush, in foundation wall of Presbyterian Church, center of south face; bronze tablet stamped "397 ALBANY 1903"	396.919
Dwaarkill, in foundation wall of the residence owned by Mr. Horne, center of north face; bronze tablet stamped "351 ALBANY 1903"	351.684

ORANGE AND SULLIVAN COUNTIES.

GOSHEN, LACKAWAXEN, MONTICELLO, PORT JERVIS, AND WHITE LAKE QUADRANGLES.

The elevations in the following list are based upon elevations by the 1903 adjustment of various bench marks on the precise-level line Hancock to Poughkeepsie. The leveling was done in 1904 under the direction of Mr. W. O. Tufts, assistant topographer, by Mr. G. M. Dimmick, levelman. Standard bench marks are stamped with legend "1903 ADJ" in addition to figures of elevation.

GOSHEN QUADRANGLE.

BURNSIDE, WEST ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO CAMPBELL HALL, THENCE SOUTHWEST ALONG THE ERIE RAILROAD, TO GOSHEN, THENCE SOUTHEAST TO GREYCOURT.

	Feet.
Campbell Hall, in brick foundation of Campbell Hall; bronze tablet stamped "408 ALBANY 1900"	409.078
Kipps station, in foundation wall of residence of J. H. Kipps, south end of west face; aluminum tablet stamped "390 ALBANY 1903 ADJ"	389.600
Goshen, in foundation wall of Episcopal Church, north end of west face; aluminum tablet stamped "439 ALBANY 1903 ADJ"	438.794
Chester, in foundation wall of Methodist Church, center of south face; bronze tablet stamped "477 ALBANY 1903 ADJ"	476.776
Greycourt, in face of north abutment of railroad bridge over highway; bronze tablet stamped "447 ALBANY"	448.282

GREYCOURT, SOUTHWEST ALONG THE NEW YORK, SUSQUEHANNA AND WESTERN RAILROAD, TO WARWICK, THENCE WEST ALONG HIGHWAY TO PINE ISLAND.

Lake station, in foundation wall of the residence of J. Halbut, center of east face; bronze tablet stamped "554 ALBANY 1903 ADJ"	553.710
Warwick, in foundation wall of Methodist Church, north end of east face; aluminum tablet stamped "538 ALBANY 1903 ADJ"	537.903
Edenville, in stone residence of J. E. Hotaling, east end of south face, 24 inches above ground; aluminum tablet stamped "473 ALBANY 1903 ADJ"	473.217
Pine Island, in center of south face of brick railroad station, Pine Island division of the Erie Railroad; bronze tablet stamped "407 ALBANY 1903 ADJ"	407.003

JOHNSON, NORTHEAST ALONG NEW YORK, SUSQUEHANNA AND WESTERN RAILROAD, TO MIDDLETOWN.

Slate Hill, in foundation wall of the store of Ourling Bros., south end of west face; bronze tablet stamped "505 ALBANY 1903 ADJ"	505.300

PORT JERVIS QUADRANGLE.

PINE ISLAND, WEST ALONG HIGHWAY TO UNIONVILLE, THENCE NORTH ALONG THE NEW YORK, SUSQUEHANNA AND WESTERN RAILROAD, TO JOHNSON.

	Feet.
Unionville, in foundation wall of Baptist Church, south end of east face; bronze tablet stamped "516 ALBANY 1903 ADJ"	516.367
Westtown, in foundation wall of storage building of T. G. Clark, south end of west face; bronze tablet stamped "480 ALBANY 1903 ADJ"	480.026
Johnson, in foundation wall of the feed store of Simpson & Manning, north end of east face; bronze tablet stamped "451 ALBANY 1903 ADJ"	450.994

PORT JERVIS, SOUTHEAST ALONG HIGHWAY TO UNIONVILLE.

Greenville, in foundation wall of Methodist Church, south end of east face; aluminum tablet stamped "1043 ALBANY 1903 ADJ"	1,043.210

OTIS, ALONG HIGHWAY WEST TO CUDDEBACKVILLE, THENCE NORTHWEST TO OAKLAND VALLEY.

Cuddebackville, in foundation wall of Methodist Church, south end of east face; aluminum tablet stamped "522 ALBANY 1903 ADJ"	522.085

MONTICELLO QUADRANGLE.

OAKLAND VALLEY, NORTHWEST TO FORESTBURG.

Oakland Valley, highway bridge over Neversink River, in ledge of rock 35 feet southeast of southeast corner; bronze tablet stamped "686 ALBANY 1903 ADJ"	685.570
Hartwood, in stone residence of Willis Butler, north end of east face, 30 inches above ground; bronze tablet stamped "1275 ALBANY 1903 ADJ"	1,275.457

WHITE LAKE QUADRANGLE.

FORESTBURG, SOUTH TO MONGAUP.

Forestburg, in foundation wall of Catholic Church, south end of east face; bronze tablet stamped "1241 ALBANY 1903 ADJ"	1,240.525

LACKAWAXEN QUADRANGLE.

Mongaup, top of north abutment of highway bridge over Mongaup Creek; bronze tablet stamped "503 ALBANY 1903 ADJ"	503.031

ST. LAWRENCE COUNTY.

BRIERHILL, CANTON, GOUVERNEUR, HOGANSBURG, MASSENA, OGDENSBURG, RED MILLS, AND WADDINGTON QUADRANGLES.

The elevations in the following list are based upon the 1903 adjustment of elevations of bench marks established by precise leveling along St. Lawrence River under the direction of the United States Board of Engineers on Deep Waterways. For additional elevations on the Hogansburg quadrangle refer to "Precise leveling." The leveling was done in 1904 under the direction of Mr. C. C. Bassett, topographer, by Mr. G. M. Dimmick, levelman. Standard bench marks are stamped with the legend "ALBANY 1903 ADJ" in addition to the figures of elevations.

BRIERHILL QUADRANGLE.

OGDENSBURG, SOUTHWEST ALONG HIGHWAY TO EDWARDSVILLE, THENCE NORTH TO MORRISTOWN.

	Feet.
Ogdensburg, 4.5 miles south of, in water table of residence of Paul Velour, north end, east face; bronze tablet stamped "317 ALBANY 1903 ADJ"	317.215
Ogdensburg, 8.93 miles south of, in foundation wall of residence of Alonzo Havens, center of east face; aluminum tablet stamped "390 ALBANY 1903 ADJ"	389.916
Ogdensburg, 11.67 miles south of, 200 feet north of residence of Luther Bloodough, 150 feet north of highway, 100 feet northwest of highway sluice, in solid rock; bronze tablet stamped "302 ALBANY 1903 ADJ"	301.488
Edwardsville, in foundation wall of Union Church, east end of south face; bronze tablet stamped "295 ALBANY 1903 ADJ"	295.298

	Feet.
Edwardsville, 2.93 miles northwest of; 2.6 miles southeast of Morristown, in solid rock, 30 feet west of southwest corner of red schoolhouse and 54 feet northeast of intersection at four corners; bronze tablet stamped "300 ALBANY 1903 ADJ"	300.227
Morristown, in foundation wall of stone warehouse, 79.5 feet from north side of United States custom-house; ¼-inch bolt (Deep Waterways bench mark)	271.288

OGDENSBURG QUADRANGLE.

OGDENSBURG, SOUTHEAST ALONG HIGHWAY TO HEUVELTON, THENCE NORTHEAST TO LISBON, THENCE NORTHWEST TO RED MILLS.

Ogdensburg, in west pier at mouth of Oswegatchie River, in United States light-house; ¼-inch bolt (Deep Waterways P. B. M. D.)	251.022
Ogdensburg, 3.8 miles south of, 50 feet east of track, 100 feet west of road, 23 feet south of private road, in rock; bronze tablet stamped "309 ALBANY 1903 ADJ"	309.132
Heuvelton, in foundation wall of Presbyterian Church, east end of south face; bronze tablet stamped "315 ALBANY 1903 ADJ"	315.188
Flockville, in foundation wall of Presbyterian parsonage, west end of north face; bronze tablet stamped "364 ALBANY 1903 ADJ"	364.086
Lisbon, in foundation wall of Presbyterian Church, center of south face; bronze tablet stamped "357 ALBANY 1903 ADJ"	357.696

HEUVELTON, SOUTH ALONG HIGHWAY 9 MILES, THENCE EAST 6 MILES TO DE KALB.

De Peyster, in foundation wall of Union Church, south end, east face; bronze tablet stamped "374 ALBANY 1903 ADJ"	374.479
De Peyster, 3.56 miles south of, 101 feet northwest of corner of Thos. Towander's residence, 7 feet west of highway; tablet stamped "332 ALBANY 1903 ADJ"	332.411
De Kalb, 0.9 mile northwest of, 600 feet southeast of residence of Horace Streeter, 50 feet north of center of highway; tablet in ledge, stamped "414 ALBANY 1903 ADJ"	413.641

DE KALB, NORTH ALONG RAILROAD TO RENSSELAER FALLS, THENCE NORTHWEST TO HEUVELTON.

De Kalb, 4.17 miles north of, 300 feet northwest of highway crossing of the Rome, Watertown and Ogdensburg division of New York Central and Hudson River Railroad, 150 feet northeast of residence of Van Hunters, 100 feet north of center of track, in solid rock; aluminum tablet stamped "393 ALBANY 1903 ADJ"	393.221
Rensselaer Falls, in water table of Methodist Church, south end of west face; aluminum tablet stamped "328 ALBANY 1903 ADJ"	327.544

GOUVERNEUR QUADRANGLE.

AT DE KALB.

De Kalb, in foundation wall of church, center of south face; bronze tablet stamped "357 ALBANY 1903 ADJ"	357.010

RED MILLS QUADRANGLE.

RED MILLS, EAST ALONG HIGHWAY TO CHIPMAN.

Red Mills, 6.93 miles east of, in foundation wall of residence of Alvia Martin, west end of south face; bronze tablet stamped "348 ALBANY 1903 ADJ"	348.175

WADDINGTON QUADRANGLE.

CHIPMAN, SOUTHEAST TO MADRID.

Chipman, in foundation wall of Scotch Presbyterian Church, center of north face; bronze tablet stamped "355 ALBANY 1903 ADJ"	354.953

MADRID, NORTHEAST TO RAYMONDSVILLE.

Madrid, 3.95 miles north of, in foundation wall of residence of N. J. Abernathy, center of east face; bronze tablet stamped "349 ALBANY 1903 ADJ"	348.942
Chases Mill (8 miles north of Madrid), in foundation wall of Hotel Creighton, center of south face; bronze tablet stamped "272 ALBANY 1903 ADJ"	271.453

CANTON QUADRANGLE.

AT MADRID.

Madrid, in foundation wall of Methodist Church, center of east face; bronze tablet stamped *"320 ALBANY 1903 ADJ"*	319.557

MASSENA QUADRANGLE.

RICHARDS LANDING, SOUTH ALONG HIGHWAY TO MASSENA SPRINGS, THENCE EAST ALONG THE GRAND TRUNK RAILWAY TO HELENA.

	Feet.
Richards Landing, 58.5 feet east of east face of Isaac Richards's residence, 3 feet north of south fence of river road, 13 feet underground; concrete base, in top of which is set a ¼-inch round-head bolt (Deep Waterways P. B. M. 6)	232.381
Massena, in northwest corner of Clark Block; bronze tablet stamped "205 ALBANY 1904"	205.000
Massena Springs, 4.33 miles east of, in south end of east abutment of railroad bridge; bronze tablet stamped "193 ALBANY 1904"	192.795

MASSENA SPRINGS, SOUTHWEST ALONG ROAD VIA RAYMONDVILLE, TO NORWOOD, THENCE ALONG RAILROAD NORTHEAST, TO WINTHROP, THENCE ALONG HIGHWAY NORTH-NORTHEAST VIA HELENA, TO HOGANSBURG.

Massena Springs, 2.75 miles southwest of, in foundation wall of north end of east face of brick house of Chas. Cahby (owned by Allen Ames), on highway leading from Massena Springs southwest to Raymondville; bronze tablet stamped "216 ALBANY 1904"	216.063
Raymondville, in foundation wall of Union Church, 10 feet from north end of west face; bronze tablet stamped "251 ALBANY 1904"	251.126
Norfolk, in foundation wall of Presbyterian Church, 12 feet south of north end of west face; aluminum tablet stamped "257 ALBANY 1904"	256.937
Norwood, in foundation wall of Music Hall, north end of east face, 28 inches above ground; aluminum tablet stamped "330 ALBANY 1903 ADJ"	330.017
Knapps, in foundation wall of residence of L. M. Maxfield, west end of south face; aluminum tablet stamped "360 ALBANY 1904"	359.764
Knapps, 3.81 miles east of, in top of north end of east abutment of railroad bridge, 420 feet west of highway crossing; aluminum tablet stamped "345 ALBANY 1904"	344.498
Winthrop, in foundation wall of Universalist Church, south end of east face; aluminum tablet stamped "337 ALBANY 1904"	336.960
Winthrop, 2.96 miles north of, in foundation wall of schoolhouse, District No. 3, town of Brasher, south end of east face; aluminum tablet stamped "291 ALBANY 1903 ADJ"	290.137
Brasher Center, in foundation wall of Methodist Church, east end of south face; aluminum tablet stamped "266 ALBANY 1903 ADJ"	265.524

HOGANSBURG QUADRANGLE.

Helena, in north end of west abutment of Grand Trunk Railway bridge over St. Regis River; bronze tablet stamped "191 ALBANY 1904"	190.807
Hogansburg, in foundation wall of St. Patrick's Church; ¼-inch bolt (Deep Waterways P. B. M. P.)	177.850

JEFFERSON AND ST. LAWRENCE COUNTIES.

ALEXANDRIA BAY, CLAYTON, THERESA, AND WATERTOWN QUADRANGLES.

The elevations published in the following list are based upon the latest adjustment heights of permanent bench marks established in the course of precise leveling under the United States Board of Engineers on Deep Waterways, at Clayton, Fishers Landing, Alexandria Bay, and Chippeway village, in the vicinity of Cape Vincent. The leveling was done in 1900 under the general direction of Mr. W. H. Lovell, topographer, by Mr. Wm. Kelley, levelman. The standard bench marks are stamped with the letters "CAPE VINCENT" in addition to figures of elevation which accord with the elevations as published by the board in 1903; the latter are approximately 1 foot higher than the accepted elevations herewith published.

CLAYTON QUADRANGLE.

CLAYTON, SOUTH VIA CLAYTON CENTER AND DEPAUVILLE, TO LIMERICK.

	Feet.
Clayton, southwest corner of Catholic Church, in water table; copper bolt	278.815
Clayton, James street, in front of Mrs. Linnell's residence, on back part of top of fire hydrant; copper bolt stamped "CAPE VINCENT 289"	287.631
Clayton Center, residence of Merritt Lengenfelter, on west face of building at south corner in stone foundation wall; bronze tablet stamped "CAPE VINCENT 423"	422.071
Depauville, at crossroads in east corner of stone foundation wall under residence of Ira Gillett; aluminum tablet stamped "299 CAPE VINCENT"	297.525
Perch River, stone schoolhouse, in northeast corner of water table; bronze tablet stamped "338 CAPE VINCENT"	336.950

LIMERICK, NORTHWEST VIA CHAUMONT, TO THREEMILE BAY.

	Feet.
Chaumont, Main street, in north face of buttress at northwest corner of Hiram Copley's stone office building; aluminum tablet stamped "295 CAPE VINCENT"	293.425
Threemile Bay, Baptist Church, in southeast corner of foundation wall; aluminum tablet stamped "266 CAPE VINCENT"	264.544

THREEMILE BAY, NORTH VIA ST. LAWRENCE, TO CLAYTON.

St. Lawrence, 225 feet north of crossroads, on east side of road, on large bowlder; bronze tablet stamped "357 CAPE VINCENT"	356.269

CLAYTON, SOUTHEAST TO LAFARGEVILLE.

Clayton, north side of Water street, in limestone water table on west side 1.85 feet northerly from the southwest corner of the Barker brick building; aluminum tablet stamped "257 CAPE VINCENT"	256.248
Clayton, 1.9 miles from, north end of west abutment of iron bridge on New York Central Railroad, northeast corner of top step; chiseled mark	325.49

LIMERICK, SOUTH TO DEXTER.

Dexter, brick schoolhouse, 2 feet easterly from northwest corner of main building, in limestone water table on north side; aluminum tablet stamped "326 CAPE VINCENT"	324.395

THERESA QUADRANGLE.

LIMERICK, EAST VIA BROWNVILLE, TO FELTS MILLS.

Brownville, in front of station; top of rail	324.8
Brownville, brick schoolhouse at five corners, midway of front building and 3.2 feet above surface of ground, in limestone foundation wall; bronze tablet stamped "355 CAPE VINCENT"	354.243
Sanford, in front of station; top of rail	470.3
Felts Mills, bridge over North Branch of Black River, on east end of south abutment (Island abutment); bronze tablet stamped "583 CAPE VINCENT"	582.456

FELTS MILLS NORTH TO EVANS MILLS (SINGLE-SPUR LINE).

Evans Mills, at southeast corner of crossroads, in north face of limestone building of Wesley Rulison (post-office building), 2.3 feet east of northwest corner; bronze tablet stamped "431 CAPE VINCENT"[a]	430.88

LAFARGEVILLE, EAST TO THERESA.

Lafargeville, Orleans Hotel (stone building), in southeast corner; aluminum tablet stamped "381 CAPE VINCENT"	380.461
Theresa, stone high school on Main street, in water table in north face and near northwest corner of belfry tower; aluminum tablet stamped "376 CAPE VINCENT"	375.915

PERCH RIVER, NORTHEAST TO STONE MILL POST-OFFICE (SINGLE-SPUR LINE).

Stone Mill post-office, north side of limestone store and dwelling of John Irwin, about 2.6 feet west of northeast corner; bronze tablet stamped "359 CAPE VINCENT"	358.293

ALEXANDRIA BAY QUADRANGLE.

THERESA, NORTH TO REDWOOD, THENCE WEST TO ALEXANDRIA BAY.

Redwood, the Dollinger House (hotel), east side and northeast corner of foundation wall; aluminum tablet stamped "365 CAPE VINCENT"	364,786
Alexandria Bay, Reformed Church, 29.9 feet north-northeast from the northwest corner, in ledge in church lot; aluminum tablet stamped "283 CAPE VINCENT"	282.267

LAFARGEVILLE, NORTH VIA OMAR TO FISHERS LANDING.

Omar, 420 feet northerly from intersection of Fishers Landing and Collins Landing roads, in bed rock on sandstone ledge, west side of the Collins Landing road, and on line with northerly side of the Omar schoolhouse, and distant 51.62 feet from northwest corner of schoolhouse; bronze tablet stamped "297 CAPE VINCENT"	295.745
Fishers Landing, crossroads near, 72.6 feet from the south corner of Mrs. Tom's residence and 131 feet northwest of the west corner of a house on the opposite side of the road; top of a round-headed ¼-inch brass bolt[b] cemented into bed rock 6 inches below surface of ground	274.351

[a] *The elevation of this* by line south from Theresa, discarded, is 1 foot lower, therefore above elevation *may be 1 foot too great.*

[b] *The letters "U. S. P. B. M. 29" are cut in the bed rock. This is a bench mark set by the Deep Waterways Commission.*

REDWOOD, NORTH VIA SOUTH HAMMOND TO CHIPPEWA VILLAGE.

	Feet.
Chippewa Village, stone schoolhouse, District No. 11, 1 foot easterly from the northeast corner, set in bed rock; bronze tablet stamped "289 CAPE VINCENT"	287.768
Chippewa Village, stone schoolhouse, District No. 11, north face of northeast corner; center-punch mark of a brass bolt (permanent bench mark C. V. of the Deep Waterways Commission)	290.698

WATERTOWN QUADRANGLE.

BROWNVILLE, SOUTHEAST TO WATERTOWN (SINGLE-SPUR LINE).

Watertown, Arsenal street, State armory, front face, west end; aluminum tablet stamped "479 CAPE VINCENT"	478.087

JEFFERSON, LEWIS, OSWEGO, AND ONEIDA COUNTIES.

BOONVILLE, CARTHAGE, HIGHMARKET, KASOAG, MEXICO, ORWELL, PORT LEYDEN, PULASKI, AND TABERG QUADRANGLES.

The elevations in the following list are based upon the Gristmill bench mark, the elevation of which is accepted as 13.863 feet above mean sea level. The initial points upon which this group of levels depends are bench marks along the precise-level line Remsen to Limerick herein reported, to which refer for additional elevations on Boonville, Port Leyden, and Carthage quadrangles, and a Deep Waterways bench mark at Rome recovered by the Army Engineers' precise-level line of 1902.

The leveling on Port Leyden quadrangle was done partly in 1902 under the direction of Mr. J. H. Jennings by Mr. J. B. Maguire, levelman, but mostly in 1905 under the direction of Mr. J. I. Gayetty, assistant topographer, by Mr. R. P. Thompson, levelman; the work on the remainder of these quadrangles was done under the direction of Mr. J. H. Jennings as follows: On the Boonville quadrangle, in 1901, by Mr. A. S. Havens, levelman; on the Carthage, Highmarket, Orwell, Pulaski, and Taberg quadrangles, in 1902, by Mr. J. B. Maguire, levelman; on the Mexico and the part of the Kasoag quadrangle lying in Oswego County, in 1903, by Messrs. G. M. Dimmick and Geo. Seidel, levelmen; and the leveling in Oneida County on the Kasoag quadrangle, in 1904, by Mr. L. E. Tucker. The standard bench marks are stamped mostly with the letters "ALBANY" in addition to the figures of elevation, and in some cases the year. Those set in 1905 on Port Leyden quadrangle were stamped "ADJ 1903."

PORT LEYDEN QUADRANGLE.

GLENFIELD, EAST ALONG HIGHWAY TO HOUSEVILLE, THENCE SOUTH VIA TURIN TO CONSTABLEVILLE, THENCE SOUTHEAST TO BOONVILLE.

	Feet.
Houseville, 180 feet south of crossroads, in northeast corner of south abutment of highway bridge; aluminum tablet stamped "1304 ALBANY"	1,304.024
Turin, at northwest corner in west side of building owned by J. E. Jones, 50 feet southeast from crossroads; bronze tablet stamped "1264 ADJ 1903"	1,264.144
Turin, 2.9 miles south of, 250 feet east of house of S. S. Freeman, 150 feet south of house of C. D. Davis, at east side of three roads intersection, 4 feet east of fence, in large rock; bronze tablet stamped "1277 ADJ 1903"	1,276.537
Constableville, in southeast corner in water table of Catholic Church; bronze tablet stamped "1260 ADJ 1903"	1,259.926
Constableville, 3.4 miles southeast of, 175 feet west of road, 0.2 mile northwest of three corners and 1.20 miles southeast of four corners, in foundation wall, east face, north corner of barn owned by Carpenter; bronze tablet stamped "1191 ADJ 1903"	1,190.281

PORT LEYDEN, NORTHEAST ALONG HIGHWAY TO FOWLERVILLE, THENCE NORTHWEST TO BRANTINGHAM, THENCE WEST TO GLENFIELD.

Port Leyden, 3.1 miles northeast of, 30 feet north of center of road, 16 feet 8 inches southeast of pine tree, 17 feet 8 inches southwest of pine tree; iron post stamped "1207 ADJ 1903"	1,206.965
Fowlerville, 50 feet north of northeast abutment of highway bridge over Moose River, 20 feet east of center of highway, in ledge of rock; aluminum tablet stamped "1182 ADJ 1903"	1,181.594
Fowlerville, 3.6 miles northwest of, at Gridles Corners, 23 feet east of road to north, 26 feet north of east and west road, 32 feet from center of crossroads; iron post stamped "1226 ADJ 1903"	1,225.959

	Feet.
Brantingham, in center of south face of foundation wall of T. Hess's barn, 250 feet west of four corners; aluminum tablet stamped "1259 ADJ 1903"	1,259.296
Greig, 0.2 mile south of three corners, 150 feet west of house of L. D. Hires, 20 feet north from center of road, in flat rock; bronze tablet stamped "826 ADJ 1903"	825.925
Glenfield, in foundation wall of New York Central and Hudson River depot; bronze tablet stamped "776 ALBANY 1900"	777.639

BOONVILLE QUADRANGLE.

BOONVILLE, ALONG PUBLIC ROAD AND BLACK RIVER CANAL, VIA WEST LEYDEN, STOKES AND FRENCHVILLE, TO REMSEN.

West Leyden, steel bridge over Mohawk River, east abutment, top of north end; bronze tablet stamped "1493 ALBANY 1901"	1,495.500
West Branch, steel bridge over West Branch of Mohawk River, south abutment, top of east end; bronze tablet stamped "1002 ALBANY 1901"	1,001.800
Stokes, south entrance to hotel on northeast corner of crossroads, west end of lower step; chisel mark	634.68
Delta, steel bridge over Mohawk River, north of State dam, top of north end of east abutment; bronze tablet stamped "516 ALBANY 1901"	516.160
Westerville, Canal Lock No. 16, southwest hollow quoin between anchors; copper bolt	587.622
Frenchville, Canal Lock No. 17, top of north end of west wall; copper bolt	595.473
Frenchville, steel bridge over creek, top of west end of south abutment; aluminum tablet stamped "593 ALBANY 1901"	593.300
Steuben, church on northwest angle of crossroads, near southeast corner of south foundation wall; aluminum tablet stamped "932 ALBANY 1901"	932.280

CARTHAGE QUADRANGLE.

LOWVILLE, WEST ALONG HIGHWAY TO GARDNERS CORNERS, THENCE NORTH VIA COPENHAGEN TO CHAMPION, THENCE EAST TO CARTHAGE.

Gardners Corners, about 5.2 miles east of, northwest corner of foundation of School No. 14 in Martins Township; bronze tablet stamped "1700 ALBANY"	1,700.643
Gardners Corners, northwest corner of post-office and general store; bronze tablet stamped "1697 ALBANY"	1,697.560
Copenhagen, highway bridge over Deer River in north wing of west abutment; aluminum tablet stamped "1174 ALBANY"	1,174.462
Champion, 400 feet south of crossroads, west wall of culvert; bronze tablet stamped "1011 ALBANY"	1,010.791

HIGHMARKET QUADRANGLE.

HOUSEVILLE, SOUTHEAST ALONG TRAIL AND HIGHWAY, TO CLEMENS CORNERS.

[The error distributed in this line is excessive.]

Wetmore, 1 mile southeast of, Page & Fairchild Company lumber camp No. 6, at upper end of tramway, in the north foundation wall of camp; bronze tablet stamped "2003 ALBANY".	2,002.641
Michigan Mills (4 miles south of Page), at entrance to trail in woods, 250 feet north by 150 feet west of mill, in bowlder; bronze tablet stamped "1778 ALBANY"	1,777.526
North Osceola (Clemens Corners), School No. 4, Osceola Township, in northeast corner of foundation wall; aluminum tablet stamped "1591 ALBANY"	1,590.955

CLEMENS CORNERS, SOUTH TO OSCEOLA.

Osceola, southwest corner of foundation of general store and post-office; aluminum tablet stamped "1033 ALBANY"	1,032.970

HOOKER, NORTH TO GARDNERS CORNERS.

Hooker, 2 miles northeast of southeast corner of Jesse Marcellus farm, 10 feet west of fence and 325 feet north of creek at the Culpepper road, in bowlder; bronze tablet stamped "1758 ALBANY"	1,756.827

TABERG QUADRANGLE.

CAMDEN, SOUTHEAST ALONG RAILROAD, TO ROME.

Camden, southwest corner of water table of town hall; aluminum tablet stamped "520 ALBANY"	519.966
Blossvale, I. J. White's store, opposite station, in southeast corner of foundation; aluminum tablet stamped "420 ALBANY"	420.230

BLOSSVALE, NORTHEAST ALONG ROAD TO WEST LEYDEN.

	Feet.
Point Rock, in northwest corner of foundation of post-office and general store; bronze tablet stamped "1017 ALBANY"	1,016.596
Point Rock, about 4 miles north of, West Leyden road, in northwest wall of Jacob Kirk's house, facing road; bronze tablet stamped "1493 ALBANY"	1,492.340

ORWELL QUADRANGLE.

GREENBORO, EAST ALONG ROAD TO HOOKER.

Oswego-Lewis County line, 0.25 mile north of, in large bowlder on northwest side of road; aluminum tablet stamped "1696 ALBANY"	1,695.582

GREENBORO, WEST ALONG ROAD TO SMARTVILLE, THENCE SOUTH TO ALTMAR.

Greenboro, on State road at post-office, in face of east wall of culvert; bronze tablet stamped "1269 ALBANY"	1,268.538
Orwell, northwest corner of crossroads, northeast corner of foundation of public fountains; bronze tablet stamped "810 ALBANY"	809.587

CLEMENS CORNERS, WEST TO REDFIELD, THENCE NORTH TO GREENBORO.

Redfield, in north foundation of Methodist Church; aluminum tablet stamped "952 ALBANY"	951.005

GREENBORO, NORTH VIA HIGHWAY TO SCHOOL NO. 7, LORRAINE TOWNSHIP (SINGLE-SPUR LINE).

East Boylston, 1.1 miles north of, School No. 7, Lorraine Township, Jefferson County, west side of Greenboro-Lorraine road, in large bowlder; aluminum tablet stamped "1262 ALBANY"	1,261.160

FROM 3 MILES NORTHEAST OF ALTMAR, SOUTHEAST TO RICARD.

Ricard, 0.5 mile north of post-office, 0.1 mile south of Orwell-Williamston Township line, in front face of foundation of Armstrong's house on west side of road; bronze tablet stamped "759 ALBANY"	758.729

PULASKI QUADRANGLE.

Altmar (Sand Bank), southeast corner of foundation of Union Free School; aluminum tablet stamped "577 ALBANY"	576.806

KASOAG QUADRANGLE.

ALTMAR, SOUTH ALONG THE ROME, WATERTOWN AND OGDENSBURG RAILROAD, TO ROME.

Kasoag, 500 feet east of Rome, Watertown and Ogdensburg Railroad, northwest corner of foundation of post-office; aluminum tablet stamped "638 ALBANY"	637.817
Williamstown, in west foundation wall of freight depot; bronze tablet stamped "603 ALBANY"	602.550
West Camden, 150 feet east of railroad, in northwest corner of foundation of Foster's general store; bronze tablet stamped "542 ALBANY"	541.784

CAMDEN, NORTH ALONG ROAD, TO OSCEOLA.

Florence, at intersection of State road and road to Osceola, southwest corner of the foundation of O'Mara's general store; bronze tablet stamped "974 ALBANY"	973.826

WEST AMBOY, ALONG HIGHWAY VIA AMBOY, TO WILLIAMSBURG.

West Amboy, in foundation wall of Union Church, east end of north face; aluminum tablet stamped "588 ALBANY 1903"	587.989
Amboy, in foundation wall of Union Church, west end of south face; bronze tablet stamped "654 ALBANY 1903"	654.158

CLEVELAND, NORTHEAST TO CAMDEN.

Elpis, in north wall of foundation of Methodist Church; bronze tablet stamped "571"	571.236

MEXICO QUADRANGLE.

VERMILION, EAST ALONG HIGHWAYS VIA MEXICO, UNION SQUARE, AND SOUTH ALBION, TO KASOAG.

	Feet.
Mexico, in foundation wall of pillar post of school building; aluminum tablet stamped "384 ALBANY 1903"	384.05
Union Square, in foundation wall of residence of E. C. Parsons, center of north face; bronze tablet stamped "467 ALBANY 1903"	467.45
South Albion, in foundation of cheese factory, south end of east face; bronze tablet stamped "645 ALBANY 1905"	645.002

UNION SQUARE, SOUTH ALONG THE ROME, WATERTOWN AND OGDENSBURG RAILROAD, TO PARISH, THENCE EAST ALONG HIGHWAYS TO WEST AMBOY.

Parish; top of southeast corner of foundation wall of station	475.95

PARISH, SOUTH ALONG THE ROME, WATERTOWN AND OGDENSBURG RAILROAD, TO CENTRAL SQUARE, THENCE EAST ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO CONSTANTIA.

Hastings, 1.2 miles west of station, in foundation wall of Presbyterian Church, south end of west face; aluminum tablet stamped "486 ALBANY" (bench mark on single-spur line)	486.355

MADISON, ONONDAGA, AND OSWEGO COUNTIES.

CAZENOVIA, CHITTENANGO, MORRISVILLE, SYRACUSE, AND TULLY QUADRANGLES.

The elevations in the following list result from a readjustment of leveling reported upon in the Appendixes to the Nineteenth and Twenty-first Annual Reports of the Director of the United States Geological Survey, with a few additional elevations.

The leveling was done as follows: On Tully and most of Syracuse and Chittenango quadrangles, in 1897, under Mr. C. C. Bassett, topographer, by Mr. Clark Brown, levelman; the remainder on north edge of Syracuse and Chittenango quadrangles was done in 1902 under Mr. Jennings, topographer, by Mr. J. B. Maguire, levelman; the leveling on Cazenovia quadrangle was done in 1897 under Mr. A. M. Walker, topographer, by Mr. Brown; that on Morrisville quadrangle was done partly in 1898 under Mr. Jennings, by Mr. Brown, partly in 1899 under Mr. Walker by Messrs. W. W. Gilbert and A. W. Gill, levelmen, and completed in 1904 under Mr. Jennings by Mr. G. M. Dimmick, levelman; and that on Oneida quadrangle was done under Mr. Walker by Messrs. Gilbert and Gill. The standard bench marks set prior to 1898 were stamped "S," referring to Syracuse, with figures of elevation 1 foot too low, while those set later were referred to Albany and stamped "ALBANY," in addition to the figures of elevation.

SYRACUSE QUADRANGLE.

SYRACUSE, SOUTH TO EAST ONONDAGA.

	Feet.
Syracuse, at Weigh lock, canal collector's office, at right of west entrance door; in water table, bronze tablet stamped "404 S"	404.320
Syracuse, Geddes Street Bridge No. 90, pier at foot of west towpath stairs, at southwest corner of stairway landing; copper plug (State engineer's bench mark No. 305)	406.230
Syracuse, station of Delaware, Lackawanna and Western Railroad; top of rail	389.3
Syracuse, West Colvin street bridge over Onondaga Creek, north end of west abutment, northwest corner of top stone; chiseled square	405.54
Syracuse, northeast corner of South Salina street and Matson avenue, on stone monument; chiseled cross	418.31
East Onondaga, northwest wing of bridge over Onondaga Creek, in coping; copper bolt stamped "S 422"	422.129

ORAN, NORTHWEST TO LIMESTONE AQUEDUCT.

Manlius, 1.5 miles northwest of, at High Bridge (double-arch), over Limestone Creek, in coping 5 feet from end of southwest wing; copper bolt stamped "S 507"	507.550
Erie Canal, Limestone Creek Aqueduct, southwest coping parapet on west wing, towpath side; copper bolt (State engineer's bench mark No. 286)	434.207

AT CONSTANTIA.

Constantia, road crossing at station; top of rail	394
Constantia, northwest corner of foundation of Presbyterian Church; bronze tablet stamped *"389 ALBANY 1903"*	389.508

TULLY QUADRANGLE.

EAST ONONDAGA, SOUTH UP ONONDAGA VALLEY TO TULLY.

	Feet.
Onondaga Castle, 30 feet north of hotel, 30 feet east of road, on well curb; chiseled square	519.83
Onondaga Indian Village, 0.25 mile south of road leading to South Onondaga, 900 feet south of cemetery and 40 feet south of small brook, in bowlder 3 feet from west road fence; copper bolt stamped "S 469"	468.705
Solvay water tank, west side of road, opposite tank; chiseled square on north side of rim of valve casing	567.57
Cardiff, 0.12 mile east of road, back of hotel, 75 feet south of brook, bowlder 6 feet broad and 2 feet high; copper bolt stamped "S 676"	676.192
Tully Center, 1.5 miles north of, 700 feet north of road west to Vesper, 500 feet south of curve in road, on bowlder in southwest corner of barnyard, west side of road; copper bolt stamped "S 819"	819.617
Tully, 200 feet north of Hotel Slayton, in water table of brick house on west side of road, at southeast corner of front of house; bronze tablet stamped "1251 S"	1,251.670

TULLY, NORTH TO JAMESVILLE, THENCE WEST TO EAST ONONDAGA.

Apulia station, 1 mile north of, on road to Syracuse, 500 feet north of white house on west side of road, 125 feet north of road summit; copper bolt in bowlder, stamped "1292 S"	1,292.510
Onativia (0.8 mile east of Lafayette), engine water column at railway station; top of anchor bolt in northwest corner of base plate	992.25
Jamesville, 0.75 mile south of, at east end of reservoir dam, in coping; cross mark on bronze tablet stamped "S 645"	645.493

CAZENOVIA QUADRANGLE.

APULIA, EAST TO FABIUS.

Fabius, 100 feet west of crossroads, Main and Cemetery streets, in wall under west window of flat-roofed frame house; tablet stamped "1284 S"	1,284.670

FABIUS, NORTHEAST TO DELPHI, THENCE NORTH TO ORAN.

Oran, 1.5 miles southeast of, 1.5 miles southeast of railroad crossing of Cherry Valley turnpike, 500 feet northwest of rock cut, on north coping of cattle pass; chiseled square	1,092.08
Oran, 300 feet west of church, 20 feet north of road, copper bolt in prominent bowlder; stamped "S 793"	793.678

FABIUS, SOUTH VIA KEENEY, TO CUYLER.

Fabius, 1.75 miles south of, east end of south abutment of iron bridge; chiseled square	1,229.79
Keeney, 500 feet east of schoolhouse, northeast wing of iron bridge, top stone; chiseled square.	1,209.31
Cuyler, 1 mile northeast of, near end of northeast wing of iron bridge over Tioughnioga River; chiseled square	1,206.31

CUYLER, NORTH VIA DERUYTER, TO DERUYTER RESERVOIR.

Deruyter, foundation of water tank, in coping, side next to track; iron bolt	1,284.70
Deruyter reservoir dam, west end of, south parapet of spillway arch, east end, face corner of coping; copper bolt stamped "1286 S"	1,286.618

DERUYTER, NORTHEAST TO SHEDS CORNERS, THENCE EAST TO NEAR GEORGETOWN, THENCE NORTH TO ERIEVILLE.

Deruyter, 2.5 miles north of by 0.5 mile east of, railroad bench mark No. 92, reservoir road, opposite old sawmill, south parapet of railroad culvert; iron bolt set in lead	1,319.110
Sheds Corners station, 600 feet south of, Tioughnioga River railroad bridge, north abutment, west end parapet; iron bolt set in cement (railroad bench mark No. 94)	1,386.053
Sheds Corners station, 600 feet south of, railroad bridge over Tioughnioga River, bridge seat, west end of south abutment; copper bolt stamped "1383 S"	1,384.360
Georgetown, 1.5 miles west of, on road to Sheds Corners, 75 feet north of road to Erieville, 20 feet north of brook, 15 feet west of road, 4 feet east of road fence; iron post stamped "S 1538"	1,538.754
Erieville, railroad bridge over road south of, on top stone, south end west abutment; chiseled square	1,619.10

ERIEVILLE, NORTH VIA NELSON TO FENNER, THENCE SOUTHWEST TO CAZENOVIA, THENCE NORTHWEST TO ORAN.

Erieville, reservoir gatehouse, 6 feet west of door, in projection of bottom course; copper bolt stamped "1473 S"	1,474.117
Nelson, 500 feet south of crossroads, on face corner of bottom stone, east end of north abutment of bridge; chiseled square	1,452.74

	Feet.
Fenner, 1 mile south of, 1,000 feet north of Peterboro turnpike, 150 feet south of orchard, 75 feet west of road, in outcrop; copper bolt stamped "1466 S"	1,467.544
Cazenovia, 942 feet south of Lehigh Valley Railroad station; iron pin in northwest corner of north abutment (railroad bench mark No. 103)	1,187.713
Cazenovia, south entrance of chapel building of seminary, water table under pilaster at east side of door; bronze tablet stamped "S 1246"	1,247.392
Cazenovia, West Shore Railroad pumping station, foundation of water tank, north pedestal next to track; chiseled square	1,196.99
Cazenovia, 2 miles northwest of West Shore Railroad station; highest point of stone monument over tunnel, 40 feet north of road	1,265.14

CHITTENANGO QUADRANGLE.

CANASTOTA, SOUTH VIA PERRYSVILLE TO FENNER.

Canastota, Peterboro Street Bridge over Erie Canal, east wing of towpath abutment; fourth step (old canal bench mark No. 52)	433.89
Canastota, 0.5 mile south of New York Central and Hudson River Railroad station; iron bolt in culvert coping (Lehigh Valley Railroad bench mark No. 118)	457.406
Clockville, 400 feet south of, 15 feet east of track; water-pipe valve case south edge of bell (Lehigh Valley Railroad bench mark No. 116)	645.79
Cotton, 0.4 mile southwest of station, culvert for farm crossing on north side of track; iron bolt in coping (Lehigh Valley Railroad bench mark No. 114)	758.016
Perryville, crossroads, new schoolhouse on site of old church, corner to right of front entrance, in stone foundation; tablet stamped "1103 ALBANY"	1,103.431

CONSTANTIA, EAST TO CLEVELAND.

Cleveland, opposite station, west end of concrete wall; bronze tablet stamped "416 ALBANY 1903"	416.504

MORRISVILLE QUADRANGLE.

FENNER, EAST ALONG HIGHWAY TO PETERBORO, THENCE SOUTH VIA MORRISVILLE TO GEORGETOWN, THENCE NORTHWEST TO ERIEVILLE.

Peterboro, side of schoolhouse, 15 feet from rear corner, in stone foundation; tablet stamped "1320 ALBANY"	1,321.183
Morrisville, front of county jail, 7 feet from west corner, in stone foundation; tablet stamped "1325 ALBANY"	1,326.259
Morrisville station, north line of; top of rail	1,225.84
West Eaton, front of schoolhouse, right of entrance, 1 foot from corner, in stone foundation; tablet stamped "1395 ALBANY"	1,395.675

GEORGETOWN STATION, EAST TO EARLVILLE.

Georgetown station, 1.75 miles southeast of, 10-foot span bridge over stream, north end of east abutment, 2.5 feet below top; iron bolt	1,493.92
Lebanon, 50 feet north of station, east of street, in foundation wall near southwest corner store; tablet stamped "1346 ALBANY"	1,345.997

EARLVILLE, NORTH TO BOUCKVILLE, THENCE WEST TO MORRISVILLE.

Hamilton, Hamilton Bank building, in water table, 2 feet west of northeast corner; aluminum tablet stamped "1126 ALBANY"	1,126.038
Hamilton, 1 mile north of; top of northwest corner of east abutment of railroad bridge over old canal	1,126.91
Bouckville, north side of stone building occupied by Coe & Brockett's store, 2 feet above ground, 1 foot west of northeast corner; aluminum tablet stamped "1149 ALBANY"	1,149.634

EARLVILLE, NORTHEAST TO POOLVILLE.

Poolville, in foundation wall of milk station, east end of south face; bronze tablet stamped "1098 ALBANY 1903 ADJ"	1,098.566

MORRISVILLE, NORTH TO DURHAMVILLE.

Munnsville, Dexter & Davis's building used as store and post-office, in south side of stone foundation, 15 feet east of southwest corner; aluminum tablet stamped "679 ALBANY".	679.661

BROOME, CHENANGO, CORTLAND, AND MADISON COUNTIES.

APALACHIN, BINGHAMTON, CORTLAND, COVENTRY, GREENE, HARFORD, NINEVEH, NORWICH, PITCHER, AND SIDNEY QUADRANGLES.

The elevations in the following list are based upon the 1903 adjustment. The leveling was done under the direction of Mr. J. H. Jennings, as follows: On Sidney and Norwich and on part of Oxford quadrangles, in 1900, by Mr. C. H. Semper, levelman, and the remainder of all in 1900 by Mr. W. E. Green, levelman, except lines to Smithfield Flat on Greene quadrangle in 1902, by Mr. C. W. Marvin, and the work on Nineveh quadrangle, which was done in 1902 by Mr. J. B. Maguire, levelman. The standard bench marks are stamped "ALBANY" in addition to the figures of elevation.

APALACHIN QUADRANGLE.

FLEMINGSVILLE, NORTH ALONG HIGHWAY TO SPEEDVILLE.

	Feet.
Weltonville, highway bridge, southwest corner of south abutment; bronze tablet stamped "930 A"	931.136

OWEGO, VIA THE LEHIGH VALLEY RAILROAD TO NEWARK VALLEY.

Flemingville, waiting room at station; top of doorsill	907.23
Newark Valley, 900 feet south of station, at northwest corner of iron Bridge No. 299 A, on abutment; bronze tablet stamped "961 A"	961.634
Newark Valley, waiting room at station; doorsill	967.03

UNION, NORTH ALONG HIGHWAY, TO MAINE (SINGLE-SPUR LINE).

Union, Duane street crossing west of station; top of rail	833.3
Union Center, Andrew & Pitcairn's store, northwest side of; mark on water table	879.82
Maine, northwest corner of Methodist Episcopal Church; aluminum tablet stamped "915 ALBANY"	916.700

UNION, SOUTH ALONG HIGHWAY, TO VESTAL CENTER (SINGLE-SPUR LINE).

Union, southwest corner of Union Methodist Episcopal Church; bronze tablet stamped "830 ALBANY"	830.751
Vestal, at Delaware, Lackawanna and Western Railroad station, road crossing; top of rail	828.7
Vestal Center, 975 feet east of, in northeast corner of abutment of iron highway bridge over Big Chocount Creek; bronze tablet stamped "985 ALBANY"	985.274

BINGHAMTON QUADRANGLE.

KIRKWOOD, WEST TO HAWLEYTON (SINGLE-SPUR LINE).

Hawleyton, northeast corner of Methodist Episcopal Church; bronze tablet stamped "1277 ALBANY"	1,277.314

BINGHAMTON TO WEST CHENANGO (SINGLE-SPUR LINE).

West Chenango, Abbot Methodist Episcopal Church, in southeast corner of wall; bronze tablet stamped "1387 ALBANY"	1,388.018

BINGHAMTON, NORTH ALONG DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO CHENANGO FORKS.

Chenango Bridge, in front of station; top of rail, south-bound track	886.7
Chenango Forks, 0.1 mile north of Delaware, Lackawanna and Western station, iron highway bridge across Tioughnioga River, in southwest abutment, northwest wing, end stone of top course; bronze tablet[a] stamped "—— ALBANY"	897.457

NINEVEH QUADRANGLE.

HARPERSVILLE, SOUTH ALONG THE DELAWARE AND HUDSON RAILROAD, TO LANESBORO, PA.

Harpersville, 1,250 feet west of, southwest corner of coping stone of abutment of iron trestle bridge No. 97; bronze tablet stamped "1051 ALBANY"	1,049.041
Centreville, in front of station; top of rail	966.5
East Windsor, in front of station, top of rail	988.2
Windsor, in south wall at southeast of foundation of Presbyterian Church; bronze tablet stamped "972 ALBANY"	972.917

[a] Set by party under State engineer, as substitute for former one in vicinity which was removed.

	Feet.
Stateline, 1 mile north of post-office, east side of river road, east side of river, at School No. 14, Windsor Township, in northwest corner of foundation of W. W. Watrous's house; bronze tablet stamped "960 ALBANY"	961.147

GREENE QUADRANGLE.

CHENANGO FORKS, NORTHEAST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO GREENE.

Willard, in front of station; top of rail	901.0
Greene, Main street crossing; top of rail	916.1
Greene, town hall, in foundation stone under middle column; bronze tablet stamped "923 ALBANY"	923.910
Greene, waiting room at station; doorsill	917.25

CHENANGO FORKS, NORTHWEST ALONG DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO LISLE.

Barker, road crossing near station; top of rail	937.6
Barker, northwest corner of abutment of highway bridge; bronze tablet stamped "934 ALBANY"	934.192
Whitney Point, waiting room at station; doorsill	956.26
Whitney Point, at road crossing north of station; top of rail	955.9

EAST PHARSALIA, SOUTHWEST TO SMITHVILLE FLATS (SINGLE-SPUR LINE).

McDonough, east foundation wall of Emanuel Baptist Church, 3 feet from southeast corner; aluminum tablet stamped "1418 ALBANY"	1,418.666
Smithville Flats, in stone foundation of Presbyterian Church, 1 foot west of southeast corner; bronze tablet stamped "1033 ALBANY 1902"	1,033.997

LISLE, NORTH ALONG HIGHWAY, TO CINCINNATUS.

Willett, southeast corner of foundation wall of Hotel Ingall; bronze tablet stamped "1039 ALBANY"	1,039.527

SIDNEY QUADRANGLE.

SIDNEY, NORTHWEST ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO GUILFORD.

New Berlin Junction, north side of station at railroad crossing; top of east rail	1,084.4
Parker, at road crossing near station; top of rail	1,423.0
Guilford, at road crossing by station; top of rail	1,520.6
Guilford, northwest corner of Episcopal Church, front face; aluminum tablet stamped "1511 ALBANY"	1,511.722

COVENTRY QUADRANGLE.

GUILFORD, ALONG THE NEW YORK, ONTARIO AND WESTERN RAILWAY, TO NORWICH.

Summit, in front of station; top of rail	1,623.0
Oxford, at road crossing near station; top of rail	1,399.1

AFTON, NORTH ALONG HIGHWAY, TO COVENTRYVILLE (SINGLE-SPUR LINE).

Coventryville, Wm. Lyman's store, 8 feet from northeast corner, in foundation wall; aluminum tablet stamped "1435 ALBANY"	1,435.291

GREENE, NORTHEAST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO OXFORD.

Brisbin, 500 feet west of station, in north end of east abutment of highway bridge over Chenango River; bronze tablet stamped "927 ALBANY"	927.277
Coventry, waiting room at station; doorsill	959.00
Oxford, Water street crossing; top of rail	969.5
Oxford, waiting room at station; doorsill	971.93
Oxford, southeast corner of Citizens' Opera House, in foundation wall; aluminum tablet stamped "982 ALBANY"	982.402

NORWICH QUADRANGLE.

NORWICH, NORTH ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO EARLVILLE.

	Feet.
Norwich, at Main street crossing of the Delaware, Lackawanna and Western Railroad; top of rail	1,006.7
Norwich, southeast corner of county court-house, on Broad street, in foundation wall; aluminum tablet stamped "1015 ALBANY 1900"	1,015.216
Galena, North Norwich, at railroad crossing near station; top of rail	1,030.8
Galena (North Norwich post-office), culvert of the New York, Ontario and Western Railway, east side of top of north abutment; bronze tablet	1,023.181
Earlville, in brickwork of schoolhouse, 1 foot to right of front door; tablet stamped "1100 ALBANY"	1,100.295

NORWICH, NORTHWEST VIA PLYMOUTH AND OTSELIC, TO GEORGETOWN STATION.

Beaver Meadow, in north face of Methodist Church; bronze tablet stamped "1484 ALBANY 1900"	1,483.869
Otselic, 500 feet east of hotel, west side of iron highway bridge, on top of south abutment; aluminum tablet stamped "1331 ALBANY 1900"	1,331.035

SOUTH PLYMOUTH, ALONG HIGHWAYS WEST TO NORTH PHARSALIA, THENCE SOUTH TO EAST PHARSALIA (SINGLE-SPUR LINE).

East Pharsalia, southeast corner of wall to chapel, 1,000 feet south of hotel; bronze tablet stamped "1557 ALBANY 1900"	1,557.240

PITCHER QUADRANGLE.

SOLON, SOUTHEAST ALONG THE ERIE AND CENTRAL NEW YORK RAILROAD, TO WILLETT.

East Freetown, at road crossing; top of rail	1,323.6
Reubens (milk station); top of rail	1,227.3
Whites Mills, in front of station; top of rail	1,169.6
Dutch Hill, road crossing; top of rail	1,131.49

CINCINNATUS, NORTHEAST ALONG HIGHWAY, TO OTSELIC.

Cincinnatus, in northeast corner of brick building of J. W. Osgood, opposite hotel; bronze tablet stamped "1045 ALBANY"	1,044.756
North Pitcher, west side of highway, in foundation wall of post-office; bronze tablet stamped "1166 ALBANY"	1,166.612

PITCHER, NORTH TO LINCKLAEN (SINGLE-SPUR LINE).

Lincklaen, at west corner of First Congregational Church, in front wall; bronze tablet stamped "1192 ALBANY"	1,192.683

TRUXTON, NORTHEAST ALONG THE LEHIGH VALLEY RAILROAD, TO CUYLER.

Cuyler, 0.25 mile east of, 500 feet east of north and south road, 4 feet south of track, in bowlder; copper bolt stamped "1256 S"	1,257.305
Cuyler, at road crossing near station; top of rail	1,127.1

HARFORD QUADRANGLE.

LISLE, NORTHWEST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO MESSENGERVILLE.

[The error distributed in this line is excessive.]

Lisle, 100 feet north of station, at road crossing; top of rail	972.4
Lisle, southeast corner of schoolhouse No. 1; bronze tablet stamped "975 ALBANY"	975.166
Killawog, waiting room at station; doorsill	1,001.03
Marathon, Main street crossing; top of rail	1,041.3
Marathon, waiting room at station; top of rail	1,043.0
Marathon, 1.5 feet from northwest corner of Peck Memorial Library, in water table; bronze tablet stamped "1019 ALBANY"	1,019.821
Messengerville, at road crossing near milk station; top of rail	1,055.7
Messengerville, road crossing near station; top of rail	1,055.6

MAINE, NORTH TO NANTICOKE (SINGLE-SPUR LINE).

	Feet.
Nanticoke, at north corner of house of Mrs. Mary Councilman, in foundation wall; aluminum tablet stamped "1100 ALBANY"	1,101.044

NEWARK VALLEY, NORTH ALONG THE LEHIGH VALLEY RAILROAD, TO POINT 4 MILES SOUTH OF DRYDEN.

Berkshire, in front of station; top of rail	1,042.7
Berkshire, Methodist Episcopal Church, north side of west or front entrance; bronze tablet stamped "1055 A"	1,055.658
Berkshire, 0.2 mile north of, at crossing near milk station; top of rail	1,046.1
Richford, waiting room at station; doorsill	1,100.02
Richford, at road crossing near station; top of rail	1,098.6
Richford, 0.1 mile north of Lehigh Valley Railroad station; bench mark under water tank, on southwest foundation stone	1,100.34
Harford Mills, waiting room at station; doorsill	1,152.44
Harford, waiting room at station; doorsill	1,185.62
Harford, in north front of Harford Methodist Episcopal Church; aluminum tablet stamped "1196 A"	1,195.861

CORTLAND QUADRANGLE.

MESSENGERVILLE, NORTHWEST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO CORTLAND.

Blodgett Mills, at road crossing near station; top of rail	1,082.9
Blodgett Mills, 1,000 feet north of station, on west side of track, in retaining wall; bronze tablet stamped "1086 ALBANY"	1,086.336

MESSENGERVILLE, WEST ALONG HIGHWAY TO VIRGIL (SINGLE-SPUR LINE).

Virgil, northeast corner stone of Methodist Episcopal Church; bronze tablet stamped "1421 ALBANY"	1,421.249

CORTLAND, SOUTHEAST ALONG THE ERIE AND CENTRAL NEW YORK RAILROAD, TO SOLON.

McGrawville, South street crossing; top of rail	1,150.2
Maybury, switch at flag station; top of rail	1,247.7
Solon, crossing at milk station; top of rail	1,311.4
Solon, in northwest corner wall of William Corcoran's house; bronze tablet stamped "1308 ALBANY"	1,308.000

CORTLAND, NORTHEAST ALONG THE LEHIGH VALLEY RAILROAD, TO TRUXTON.

Lorrings (flag station), at road crossing; top of rail	1,105.9
East River (flag station), at road crossing; top of rail	1,132.8
East Homer, in front of station; top of rail	1,132.3
East Homer, waiting room at station; doorsill	1,134.29
Truxton, waiting room of station; doorsill	1,156.78
Truxton, in front of station; top of rail	1,154.7
Truxton, corner of Methodist Episcopal Church; bronze tablet stamped "1159 ALBANY".	1,159.096

ITHACA JUNCTION, NORTH ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO TULLY.

Cortland, waiting room at station; doorsill	1,114.22
Cortland, State Normal School building, north side of east entrance; aluminum tablet stamped 1122 "ALBANY"	1,121.855
Homer, James street crossing; top of rail	1,132.9
Homer, waiting room at station; doorsill	1,132.82
Little York, at road crossing; top of rail	1,162.0
Preble, at road crossing; top of rail	1,188.3
Preble, Presbyterian Church, in southeast corner of wall; bronze tablet stamped "1212 ALBANY"	1,212.554

CORTLAND, ALONG THE LEHIGH VALLEY RAILROAD, TO M'LEAN.

Cortland, Lehigh Valley station; waiting-room doorsill	1,130.32
McLean, E. G. Galloup's store, on east side of wall; chiseled cross	1,119.74

CAYUGA, CHEMUNG, ONONDAGA, TIOGA, AND TOMPKINS COUNTIES.

AUBURN, DRYDEN, MORAVIA, OWEGO, SKANEATELES, AND WAVERLY QUADRANGLES.

The elevations in the following list result from a readjustment of leveling reported upon in the Appendixes to the Eighteenth and Twentieth Annual Reports of the Director, United States Geological Survey, with additional work on Owego quadrangle. Leveling done by the Lehigh Valley Railroad was employed extensively in the readjustment. For additional elevations on Owego and Waverly quadrangles see "Precise leveling."

The leveling on Auburn, Skaneateles, and Moravia quadrangles was done in 1896 under the direction of Mr. J. H. Jennings, topographer, mostly by Mr. A. B. Pomme, levelman; that on Waverly and Dryden and part of Owego quadrangles was done in 1898 under the direction of Mr. R. D. Cummin, topographer, by Mr. W. W. Gilbert, levelman, and the remainder on the Owego quadrangle was done in 1900 under the direction of Mr. Jennings by Mr. W. E. Green, levelman. The standard bench marks on Waverly, Dryden, and Owego quadrangles are stamped "ALBANY" or "A" in addition to figures of elevation, mostly 1 foot too low. Those set in 1896 have no datum letter and the elevations stamped are mostly 2 feet too high on Auburn and Moravia quadrangles and 3 feet too high on Skaneateles quadrangle, but the corrected elevations given on the latter quadrangle are possibly 1 foot low, though the nearest of two connections which differed by that amount was taken.

OWEGO QUADRANGLE.

OWEGO, NORTH ALONG RAILROAD TO GRIDLEYVILLE.

	Feet.
Owego, in northwest corner of foundation wall of court-house; aluminum tablet stamped "818 ALBANY"	818.387
Catatonk, at road crossing into sawmill yard; top of rail	849.8
Candor, at road crossing south of station; top of rail	892.8
Gridleyville, 0.3 mile south of, Bridge No. 10, in northeast pedestal stone; bronze tablet stamped "919 ALBANY"	919.464
Gridleyville, at road crossing; top of rail	928.4

OWEGO, SOUTH ALONG HIGHWAY TO GIBSON CORNERS.

Owego, Main street road crossing; top of rail	807.8
Kile triangulation station, 2.8 miles south of Owego; top of stone monument	1,280.349
Gibson Corners, 1.5 feet from south end of schoolhouse, in west side wall; bronze tablet stamped "1531 ALBANY"	1,531.558

SPENCER, SOUTH TO HALSEY VALLEY (SINGLE-SPUR LINE).

Halsey Valley, northwest corner of Dr. H. P. Vosburgh's house; bronze tablet stamped "1065 ALBANY"	1,065.618

VAN ETTEN, EAST ALONG THE LEHIGH VALLEY RAILROAD, TO NORTH CANDOR.

Spencer, Lehigh Valley Railroad crossing; top of rail	999.9
Spencer, southwest corner of Main and Tioga streets, in water table on north side of Fisher Block, 1 foot east of northwest corner; bronze tablet stamped "A 995"	995.395
East Spencer, Lehigh Valley Railroad station; top of rail	986.3
West Candor, Lehigh Valley Railroad station; top of rail	955.9
North Candor, Lehigh Valley Railroad station; top of rail	948.7

WAVERLY QUADRANGLE.

WELLSBURG, NORTH ALONG HIGHWAY TO BREESPORT, THENCE EAST ALONG THE LEHIGH VALLEY RAILROAD, TO ERIN, THENCE NORTH TO PARK, THENCE SOUTHEAST TO VAN ETTEN, THENCE SOUTH TO WAVERLY.

Breesport, county buildings, on west face of foundation of brick structure, 3 feet above ground and 25 feet south of northwest corner, between second and third cellar windows; aluminum tablet stamped "A 1160"	1,160.580
Erin station, Lehigh Valley Railroad; chiseled mark on top of foundation, 6 feet south of northeast corner	[illegible]
Erin station, in front of east line of; top of rail	1,247.56
Park station, south side of water tank; iron pin in foundation (Lehigh Valley Railroad bench mark)	1,580.39

	Feet.
Park station, at highway crossing; top of rail	1,506.5
Park station, 1 mile east of, on Lehigh Valley Railroad; iron pin in top at center of east abutment of trestle (Lehigh Valley Railroad bench mark No. 18)	1,391.84
Park station, 1.75 miles east of, on Lehigh Valley Railroad; iron pin in top of south end of east abutment of trestle (Lehigh Valley Railroad bench mark No. 19)	1,304.57
Swartwood, east corner of water tank; iron pin in foundation (Lehigh Valley Railroad bench mark No. 21)	1,053.60
Swartwood, in front of station, opposite north line; top of rail	1,053.3
Swartwood, front of residence of Benjamin Barnes, center of foundation, north wing; aluminum tablet stamped "A 1054"	1,054.479
Van Etten, Warner street crossing of Lehigh Valley Railroad, Elmira and Cortland branch; top of rail	1,005.69
Van Etten, southeast corner of Waverly and Warner streets; water table at northwest corner of new brick building	1,018.84
Van Etten Junction, crossing of Elmira, Cortland and Northern division of Lehigh Valley Railroad; top of rail	992.2
Van Etten Junction, 0.87 mile south of, southeast abutment of iron highway bridge over Cayuta Creek, 200 feet west of Lehigh Valley Railroad; iron pin (Lehigh Valley Railroad bench mark)	970.32
Reniff, southeast corner of highway bridge over Cayuta Creek; chisel mark on shoe	916.94

DRYDEN QUADRANGLE.

NORTH CANDOR, NORTH ALONG THE LEHIGH VALLEY RAILROAD, TO ITHACA.

Willseyville, Stevens Hotel, east end of walk between driveway and building; chisel mark on south end of stone step	948.38
Willseyville, 2.25 miles north of, Delaware, Lackawanna and Western Railroad bridge over highway, south abutment under west rail and 2.5 feet above ground; aluminum tablet stamped "957"	958.250
Besemer, 1.12 miles west of, in field 50 feet north of track; hickory tree blazed "B. M. 46," spike in root (Lehigh Valley Railroad bench mark)	952.40
East Ithaca, 2.5 miles southeast of, 0.25 mile west of small white schoolhouse among pines on south side of track and immediately west of private road crossing; iron pin set in bowlder 20 feet north of track (Lehigh Valley Railroad bench mark No. 472)	943.69
East Ithaca, 1.25 miles southeast of, 450 feet northwest of highway crossing and 20 feet north of track; iron pin set in large bowlder (Lehigh Valley Railroad bench mark No. 49)	901.37

BESEMER, EAST ALONG HIGHWAY TO CAROLINE, THENCE SOUTH TO SPEEDSVILLE, THENCE WEST TO WILLSEYVILLE.

Slaterville Springs, Methodist Church; chisel mark on top of southwest corner of foundation	1,117.81
Slaterville Springs, town clerk's office, east side of building, near northeast corner, 3 feet above ground; aluminum tablet stamped "A 1120"	1,121.400
Speedsville, O. F. Freeland's store, west side of building, 8 feet north of southwest corner, in top course of masonry foundation; aluminum tablet stamped "A 1121"	1,121.939
Perryville schoolhouse, east side of road, west end of first stone step from top, south of door; chisel mark	1,010.19

CAROLINE, NORTH TO DRYDEN, THENCE WEST TO ETNA.

Caroline, 1.25 miles north of, at West Oswego Creek, on abutment at southwest corner of bridge; chisel mark	1,305.36
Dryden, 2 miles south of, first crossing of Lehigh Valley Railroad north of Dryden Lake; top of rail	1,162.7
Dryden, South street crossing; top of rail	1,101.8
Dryden, Southworth Library building, in foundation course of masonry south front of structure; aluminum tablet stamped "A 1090"	1,090.520

ETNA, SOUTHWEST ALONG THE LEHIGH VALLEY RAILROAD, TO ITHACA.

Etna, Lehigh Valley Railroad station, opposite east line of building; top of rail	1,025.6
Varna, 0.5 mile northeast of, at iron highway bridge over Fall Creek, west end of south abutment; chisel mark	956.43
Varna, opposite west line of station; top of rail	997.5
Varna, 1.5 miles southwest of, 1,200 feet west of milepost 52, on north side of track; iron pin set in bowlder (Lehigh Valley Railroad bench mark No. 51)	935.55
East Ithaca, 0.5 mile northeast of, abutment at southwest corner of iron highway bridge over Cascadilla Creek; iron pin (Lehigh Valley Railroad bench mark No. 502)	866.88

	Feet.
East Ithaca, opposite south line of station; top of west rail, main track	873.0
Ithaca, south end of Cornell University civil-engineering building, bottom course of foundation, 5 feet east of southwest corner; aluminum tablet stamped "A 814"	815.107

MORAVIA QUADRANGLE.

ETNA, NORTHEAST ALONG THE LEHIGH VALLEY RAILROAD, TO M'LEAN.

Freeville, Lehigh Valley Railroad freight house, west side of fourth pedestal from south end under freight platform; chisel mark	1,047.30
McLean, north of small bridge at west side of square and south of store and post-office, in east wall of mill race; chiseled square marked "U. S. G. S. 1123"	1,119.61

M'LEAN, WEST TO MIDWAY, THENCE NORTH TO NORTH LANSING, THENCE NORTHEAST TO LOCKE, THENCE NORTH TO MORAVIA.

Peruville, 200 feet east of station, iron highway bridge, on southeast bridge seat; chiseled square	1,026.95
Peruville, 2.25 miles west of, in southeast corner of intersection of road running south, on southeast corner of stone step to front entrance of schoolhouse; chiseled square	1,396.82
Benson Corners, 0.33 mile south of, under most northerly of four butternut trees nearly opposite farmhouse, in bowlder in east fence; copper bolt stamped "U. S. G. S. 1320 ft."	1,317.900
Midway, 1 mile north of, about 200 feet south of road running east and west, on southwest bridge seat of small bridge; chiseled square	983.20
North Lansing, R. Beardsley's store, south of and close to building; iron post stamped "U. S. G. S. B. M. 1005 Ft."	1,001.986
Locke, 3 miles southwest of, bridge at crossroads, on southeast bridge seat; chiseled square.	941.63
Locke, George Culver's store, corner of Main and Mill streets, on top of curbstone; chiseled square	793.07
Locke station, railroad bridge over Owasco Inlet, 3,260 feet north of station; iron bolt cemented in southeast abutment	781.77

SAYLES CORNERS, SOUTHWEST TO MORAVIA.

Wilson Corners, top of retaining wall at blacksmith shop, in limestone bowlder; chiseled square	1,091.24
Montville, grist mill north of blacksmith shop, in northeast corner of road running east, west step stone to stairs; chiseled square	913.57
Moravia, Moravia House, corner of Cayuga and Main streets, in northeast corner of foundation; bronze tablet stamped "743"	740.480
Moravia, Church street, at top of schoolhouse hill, capstone at north end of culvert; chiseled square	869.91

MORAVIA, EAST ALONG HIGHWAY TO DRESSERVILLE, THENCE SOUTH TO M'LEAN.

Dresserville, Kenyon's tannery lower dam, on eighth step from top of east wing; chiseled square	1,278.77
Dresserville, George Fritz's sawmill and gristmill, in west end of doorsill to south door of boiler house; copper bolt stamped "U. S. G. S. B. M. 1291 ft."	1,286.680
Lake Como, opposite, 100 feet north of intersection of road running west, on stone at foot of southwest wing wall of small bridge; chiseled square	1,332.47
Groton City, 2.25 miles north of, west abutment of Fall Creek Bridge, on capstone of north wing; chiseled square	1,292.33
Groton City, 0.25 mile north of, farm of George A. Bliss, 150 feet east of dwelling house and 125 feet east of road; copper bolt in bowlder stamped "U. S. G. S. B. M. 1372 ft."	1,368.780
Lafayette, south end of culvert on road running east and about 150 feet east of intersection of road running north and south, on capstone; chiseled square	1,248.44
McLean, east side of North street, 60 feet south of evergreen trees planted in graveyard, on a straight line with road fence, in bowlder opposite upper part of graveyard; copper bolt stamped "U. S. G. S. B. M. 1234 ft."	1,231.290

SKANEATELES QUADRANGLE.

SKANEATELES, SOUTH ALONG HIGHWAY TO OWASCO, THENCE SOUTHEAST TO GLENHAVEN.

Skaneateles, in west wing wall of State dam, first step from top; copper bolt stamped "U. S. G. S. B. M. 870 ft."	866.648
Owasco, brook north of, on northwest seat of iron bridge; chiseled square	792.47
Owasco, 0.25 mile southeast of, on road to Twelve Corners, in fifth foundation stone from south end of dry wall on east side of north approach to small iron bridge; copper bolt stamped "U. S. G. S. B. M. 853 ft."	849.588

	Feet.
Owasco, 2 miles from, on north wing stone southwest end of culvert at forks of road; chiseled square	1,175.88
Twelve Corners, house in northeast corner of road crossing, on bowlder in front yard; chiseled square	1,391.91
Kelloggsville, opposite road from Twelve Corners, west side of maple tree and scales in front of W. D. Sayles's store, in bowlder; copper bolt stamped "U. S. G. S. B. M. 1424 ft."	1,421.185
Sayles Corners, at south end of culvert across road from east; chiseled square	1,587.33
Skaneateles Lake, bridge over south inlet at intersection of roads southwest and north and south, on stone 3 feet east of southwest bridge seat; chiseled square	976.17
Glenhaven, iron bridge at south inlet of Skaneateles Lake, on northwest bridge seat; chiseled square	868.95

MARCELLUS STATION, SOUTH TO MARCELLUS.

Marcellus station, road culvert west of; southeast corner of coping stone on south wing wall	431.58
Limekiln, bridge across mill race opposite, on coping stone of north end of northeast wall; chiseled square	470.52
Marcellus Falls, at road running east, stone arch over creek, on coping stone at west end of parapet wall; chiseled square	513.17
Marcellus powder works, iron bridge south of, on southeast bridge seat; chiseled square	611.03
Marcellus, stone arch over Otisco Lake outlet (Ninemile Creek), on coping stone north of parapet wall; chiseled square	651.21
Marcellus, Main street, stone arch over Otisco Lake outlet (Ninemile Creek), in fourth coping stone east from angle at west end of north parapet wall, a little west of center; copper bolt stamped "U. S. G. S. B. M. 655 ft."	651.221

SKANEATELES, SOUTHEAST ALONG HIGHWAY TO MARIETTA, THENCE SOUTH TO GLENHAVEN.

Clintonville, culvert under road from south, on stone at southeast end; chiseled square	1,087.37
Marietta Hotel, at corner of roads to Clintonville and Rose Hill, on foundation stone north corner of plaza; chiseled square	796.15
Otisco Lake, highway bridge below State dam, on road from Marietta to Amber, southwest corner of bridge seat; chiseled square	776.86
Otisco Lake outlet, at west end of State dam, close to gate chamber; crest of spillway	782.62
Otisco Lake outlet, east wing of State dam, in south coping stone; copper bolt stamped "U. S. G. S. B. M. 789 ft."	786.230
Borodino, 0.5 mile north of, Thorn Hill road, 215 feet south of intersection of first road running east, in sandstone bowlder on east side of driveway; copper bolt stamped "U. S. G. S. B. M. 1021 ft."	1,017.634
Spafford, in northwest corner of road crossing; water table at southeast corner of church	1,691.74
Spafford, 0.5 mile south of, in Bruce Norton's lot, 200 feet from fence on bank of small brook, east side of road; copper bolt stamped "U. S. G. S. B. M. 1654 ft."	1,650.831

MORAVIA, NORTH TO CASCADE.

Cascade Hotel, 1.25 miles northwest of, in limestone bowlder 10 feet southwest of bridge over small brook, on road running north and south; copper bolt stamped "U. S. G. S. B. M. 1091 ft."	1,088.284

AUBURN QUADRANGLE.

CASCADE, NORTHWEST TO SCIPIO, THENCE WEST VIA BARBERS CORNERS TO LEVANA, THENCE SOUTH TO AURORA.

Cascade Hotel, 2 miles west of, on capstone of culvert in southeast corner of intersection of road running south; chiseled square	1,266.58
Scipio public school, 30 feet southeast of corner of, in bowlder; copper bolt stamped "U. S. G. S. B. M. 1205 ft."	1,203.211
Scipioville, Watkins's store, on northeast corner of stepstone; chiseled square	989.46
Barbers Corners, 250 feet south of, in limestone bowlder on east side of road under apple tree near bridge; copper bolt stamped "849"	847.954
Aurora, Cayuga Military Academy, south door of basement, in west end of doorsill; copper bolt stamped "437"	435.732

LEVANNA, NORTH ALONG THE LEHIGH VALLEY RAILROAD, TO UNION SPRINGS.

[The error distributed in this line is excessive.]

Union Springs, basement door at south end of sanitarium, in west end of doorsill; copper bolt stamped "U. S. G. S. B. M. 421 ft."	418.680

UNION SPRINGS, NORTHWEST ALONG THE LEHIGH VALLEY RAILROAD, TO AUBURN.

	Feet.
Half Acre, 1.25 miles southwest of railroad station, on stone near southwest corner of intersection of road to south; chiseled square	706.76
Aurelius, on mounting block in southwest corner of four corners; chiseled square	644.27
Aurelius, 1.75 miles east of, on southeast bridge seat of bridge over Crane Brook; chiseled square	635.84
Auburn, 411 feet south of south side of Genesee street, on east side of track; bolt in rock (Lehigh Valley Railroad bench mark, railroad elevation 647.083)	647.77
Auburn, south side of Genesee street, between Sherwood and Delevan streets; west side of coping (city bench mark)	643.17
Auburn, northwest corner of court-house; water table (city bench mark)	708.82
Auburn, North and Market streets; top of monument near southwest corner of city hall lot (city bench mark)	671.75
Auburn, post-office building, Genesee street entrance, in top of wing stone at east end of steps; bronze tablet stamped "710 feet"	707.719

UNION SPRINGS, NORTH ALONG HIGHWAY TO CAYUGA.

Cayuga, on northwest corner of doorsill to north door of malt house; chiseled square	387.83
Cayuga, Cayuga and Seneca Canal, Lock No. 10, between anchors of west wing of south gate; copper bolt stamped "U. S. G. S. B. M. 392 ft."	390.420

AUBURN, SOUTH ALONG HIGHWAY TO SCIPIO.

Auburn, Genesee street, 2 miles south of, on Lehigh Valley Railroad; iron bolt in box culvert, 911 feet north of north side of public road	721.13
Fleming, Methodist Episcopal Church; copper bolt in door step, south door, stamped "U. S. G. S. B. M. 912 ft."	910.051

THROOPSVILLE, SOUTHWEST ALONG HIGHWAY TO CAYUGA.

Throopsville, 1.75 miles east of; iron bolt in foundation of culvert 201 feet north of point of switch (Lehigh Valley Railroad bench mark)	546.060
Throopsville, north side of road just east of four corners, on southeast corner of stone horse block; chiseled square	516.36
Fosterville, 3 miles west of, 800 feet east of canal, south side of road, on granite bowlder horse block in front of wood-colored house; chiseled square	408.87

CAYUGA, MONROE, ONONDAGA, OSWEGO, AND WAYNE COUNTIES.

BALDWINSVILLE, CLYDE, FULTON, MACEDON, OSWEGO, PALMYRA, ROCHESTER, AND WEEDSPORT QUADRANGLES.

The elevations in the following list are the result of the readjustment of primary levels previously reported in Appendixes to the Twentieth and Twenty-first Annual Reports of the Director, United States Geological Survey. The leveling was done as follows: On Rochester, Macedon, and Palmyra quadrangles and part of Clyde quadrangle under Mr. J. H. Wheat, topographer, in 1898, and the remainder on the Clyde quadrangle under Mr. J. H. Jennings, topographer, in 1899; on Rochester quadrangle, by Mr. C. H. Semper, levelman, and on the other quadrangles by Messrs. Semper and D. E. Baxter, levelmen. The leveling on Oswego, Weedsport, and Baldwinsville quadrangles was done in 1898 under Mr. E. B. Clark, topographer, by Mr. Baxter, and that on Fulton quadrangle was done also in 1898, under Mr. Clark, by Messrs. Semper and Baxter. The standard bench marks are stamped mostly "OSWEGO" in full or abbreviated, in addition to figures of elevation, which are mostly 1 foot low.

FULTON QUADRANGLE.

OSWEGO, SOUTH VIA FULTON TO HINMANSVILLE.

	Feet.
Minetto, State dam, west side of Oswego River, southeast corner of third bulkhead pier on top of surface; aluminum tablet stamped "302 A"	303.344
Minetto, 0.07 mile south of, Oswego Canal, between cinchers of middle gate; copper bolt (canal bench mark at Lock No. 12)	308.54
Minetto, 1.3 miles south of, south wing of west abutment, second step; copper bolt (canal bench mark at bridge)	311.28
Minetto, 3.0 miles south of, Oswego Canal, between cinchers of middle gate; copper bolt (canal bench mark Guard Lock No. 4)	311.99

	Feet.
Minetto, 4.7 miles south of, Oswego Canal, Lock No. 11, middle hollow between cinchers; copper bolt (L. S. B. M. No. 129)	320.18
Minetto, 5.5 miles south of, Oswego Canal, on first stone step, south end abutment; copper bolt (L. S. B. M. No. 128)	322.47
Minetto, 5.9 miles south of, Oswego Canal, in first step of abutment, south end; copper bolt (L. S. B. M. No. 127)	323.16
Minetto, 6.1 miles south of, Oswego Canal, on north hollow quoin between cinchers; copper bolt (L. S. B. M. No. 126)	329.025
Minetto, 6.2 miles south of, Lock No. 9, in middle hollow quoin between cinchers; copper bolt (Oswego Canal bench mark)	337.15
Fulton, northwest corner of town hall, South First street, in water table; aluminum tablet stamped "363 A"	364.542
Fulton, 0.5 mile south of, Oswego Canal, Lock No. 8, on lower hollow quoin between cinchers; copper bolt (L. S. B. M. No. 125)	347.946
Fulton, 0.8 mile south of, Oswego Canal, first step of abutment, south end; copper bolt (canal bench mark)	351.00
Fulton, 0.9 mile south of, Oswego Canal, Guard Lock No. 3, in lower hollow quoin between cinchers; copper bolt (canal bench mark)	352.03
Fulton, 4.3 miles south of, Lock No. 7, in middle hollow quoin between cinches; copper bolt (canal bench mark)	353.52
Fulton, 5.5 miles south of, Oswego Canal, unused lock, in lower hollow quoin; copper bolt (canal bench mark)	359.89

FULTON, EAST TO GILBERTS MILLS, THENCE NORTH TO VERMILION, THENCE WEST TO OSWEGO.

Gilbert Mills, southeast corner of schoolhouse, District No. 5; aluminum tablet stamped "435 OSWEGO"	436.144
Vermilion, on southeast corner of Methodist Church, Main street; aluminum tablet stamped "422 OSWEGO"	422.559
South Scriba, on north side of Hall road, in southeast corner of Ladies' Aid Society hall; aluminum tablet stamped "400 OSWGO"	401.517
Lansing, on northeast corner of brick schoolhouse; chiseled square	418.84
Oswego, at Rome, Watertown and Ogdensburg railroad crossing, on Hall road; top of west rail	322.1

FULTON, SOUTHWEST TO BOWENS CORNERS.

Fulton, 1.9 miles west of, 30 feet east of road to south, south end of west abutment of highway bridge over Lye Creek; chiseled square	371.84
Bowens Corners, south door of brick schoolhouse, District No. 5, on stone doorstep; aluminum tablet stamped "449 OSWGO"	449.603

BALDWINSVILLE QUADRANGLE.

HINMANSVILLE, SOUTH VIA BALDWINSVILLE TO NEWPORT.

Hinmansville, Oswego Canal, Lock No. 6, in lower hollow quoin between cinchers; copper bolt (canal bench mark)	360.68
Phoenix, Culvert street, Oswego Canal, in second step of bridge abutment, south end; copper bolt (canal bench mark)	364.88
Phoenix, northwest corner of Union Academy, Bridge and Cherry streets, Cherry street front, in water table; aluminum tablet stamped "394 OSWGO"	395.020
Phoenix, Oswego Canal, in second step of abutment, south end, on Bridge street; copper bolt stamped "364 A" (canal bench mark)	365.000
Phoenix, Oswego Canal, Guard Lock No. 1, in upper hollow quoin between cinchers; copper bolt stamped "363 A" (canal bench mark)	364.400
Baldwinsville, southeast corner of Free Academy, Elizabeth street; aluminum tablet stamped "423 OSWGO"	424.348
Warners, 700 feet east of crossroads, Mr. Hawley's brick dwelling, in east end of stone water table; aluminum tablet stamped "477 OSWGO"	478.190
Newport, at Warners, southwest corner of hotel barn, 30 feet north of canal; chisel mark on bowlder (Erie Canal bench mark)	412.587

BOWENS CORNERS, SOUTH TO PERU.

Plainville, 300 feet west of four corners at center of town, north side of road, in top step of schoolhouse, District No. 5; aluminum tablet stamped "403 OSWGO"	403.689
Peru, highway bridge over Erie Canal, towpath abutment, in west end of bottom step; copper bolt (N. Y. S. B. M. No. 324)	413.643

JORDAN (SET FROM CANAL BENCH MARK 330).

	Feet.
Jordan, in Jordan Academy, front of building, 3 feet east of door, in stone water table; aluminum tablet stamped "OSWGO 481"	480.505

OSWEGO QUADRANGLE.

RED CREEK, NORTHEAST TO OSWEGO.

Red Creek, on Second street, Red Creek Academy, 225 feet north of Rome, Watertown and Ogdensburg Railroad, on west side of street; aluminum tablet in stone foundation stamped "355 OSWGO"	356.410
Red Creek, 200 feet west of station, road crossing; top of rail	335.3
Sterling, 2.1 miles southwest of, railroad bridge over highway, fourth step of east wing of north abutment; chiseled square	339.48
Sterling, at crossing of the Rome, Watertown and Ogdensburg and the Lehigh Valley railroads; top of rail	321.0
Hannibal, schoolhouse on Oswego street, in stone doorsill of north entrance; aluminum tablet stamped "354 OSWGO"	355.057
Oswego, 3.5 miles north of, wharf line of south side of basin, 5 feet from east face of old United States stone pier at foot of West Third street; top of iron bolt flush with top of masonry, stamped "U. S. + B. M."	251.898
Oswego, northeast corner of post-office building, corner of Oneida and West First streets, in water table; aluminum tablet stamped "295 OSWGO"	295.753

WEEDSPORT QUADRANGLE.

STERLING STATION, SOUTH ALONG THE LEHIGH VALLEY RAILROAD TO CATO, THENCE SOUTHWEST ALONG HIGHWAY TO CONQUEST, THENCE SOUTH TO PORT BYRON.

Ira, highway crossing 200 feet north of station; top of east rail, main track	419.7
Ira station, about 700 feet southwest of station, in northeast corner of water table of brick house; bronze tablet stamped "430 OSWGO"	431.585
Cato, highway crossing 200 feet north of station; top of east rail, main track	419.0
Cato, northwest corner of Main and North streets, southeast corner of water table of brick building; aluminum tablet stamped "461 OSWGO"	462.811
Conquest, 0.6 mile south of, east side of road, in south side front of brick house, in water table; bronze tablet stamped "449 A"	450.454
Port Byron, West Shore Railroad; top of north rail	396.8
Port Byron, Canal street highway bridge over Erie Canal, east wing of towpath abutment; copper bolt	406.63
Port Byron, highway bridge just east of Canal street, east wing of towpath abutment; copper bolt	407.54
Port Byron, Lock No. 52, fourth step from west end of north side lock pier; copper bolt (N. Y. 352)	403.279
Port Byron, Lock No. 52, east hollow quoin south side of lock; head bolt stamped "404 A".	406.005

MONTEZUMA AND WEEDSPORT, SET FROM STATE ENGINEER'S BENCH MARK.

Montezuma, in northeast corner of Methodist Church, Auburn street, in foundation masonry; bronze tablet stamped "417 OSWEGO"	417.449
Weedsport, Methodist Episcopal Church, on south side of Brutus street, in front face of east end of foundation wall; bronze tablet stamped "433 OSWEGO"	433.256

CLYDE QUADRANGLE.

CLYDE (SET FROM STATE BENCH MARKS.)

Clyde, Methodist Episcopal Church, on northeast side of Sodus street, in north end of foundation of front wall; aluminum tablet stamped "406 OSWEGO"	405.196

WALLINGTON, EAST ALONG HIGHWAY AND RAILROAD TO RED CREEK.

Alton, highway crossing; top of rail	402.8
Dunbar, road crossing; top of north rail	393.7
North Rose, in front of station; top of rail	387.80
Wolcott, Main street highway crossing; top of north rail	361.7
Wolcott, northwest corner of Main and Clyde streets, in masonry foundation southeast corner of Baptist Church; aluminum tablet stamped "378 OSWEGO"	379.026

WOLCOTT, SOUTH ALONG HIGHWAY TO MAYS POINT.

South Butler, in northwest corner of schoolhouse on road east from hotel; bronze tablet stamped "399 OSWEGO 1899"	399.717

	Feet.
Savannah, northeast corner Main and East Church streets; top of concrete monument	420.20
Savannah, 4.8 miles south of, Barry Bridge No. 1, Western division, in top of first step of west wing of north abutment; top of copper bolt stamped "B. M. 2"	395.16

NORTH ROSE, SOUTHWEST ALONG HIGHWAY TO LYONS.

Wayne Center, in southeast corner of schoolhouse on crossroads; bronze tablet stamped "438 OSWEGO 1899"	438.942
Lyons, on west side of Broad street, between Church and Pearl streets, in Dutch Reformed Church; bronze tablet stamped "OSWEGO 437, 1899"	438.395
Lyons, Water street highway bridge over canal, east wing of towpath abutment; chiseled square	407.727

PALMYRA QUADRANGLE.

ONTARIO, EAST ALONG HIGHWAY TO WALLINGTON.

Williamson, in front of station; top of rail	420.2
East Williamson, at road crossing; top of rail	417.0
Sodus, highway crossing, main track; top of rail	428.8
Sodus, southwest corner of Third Methodist Episcopal Church, on Ridge road, in water table; aluminum tablet stamped "457 O"	458.255
Wallington, on southwest corner of stone foundation of railroad water tank; chiseled square.	405.90

GALLOWAY'S BRIDGE, NORTHEAST ALONG HIGHWAYS TO EAST PALMYRA.

East Palmyra, 2.3 miles southwest of, Galloway's highway bridge over Erie Canal, east wing of towpath abutment; chiseled square	449.57
East Palmyra, Presbyterian Church, in northwest corner of water table; bronze tablet stamped "471 OSWGO"	471.826

WILLIAMSON, SOUTH ALONG HIGHWAY TO MARION (SINGLE-SPUR LINE).

Williamson, Union Academy, northwest corner of building; aluminum tablet stamped "454 OSWGO"	454.843
Marion, 500 feet north of four corners, Main street front of the Marion Collegiate Institute; aluminum tablet stamped "462 OSWGO"	462.813

WALLINGTON, SOUTH ALONG THE NORTHERN CENTRAL RAILWAY TO NEWARK.

Wallington, 0.9 mile south of, Culvert No. 45, over Salmon Creek, northwest corner of masonry; chiseled square	405.90
Sodus Center, 0.3 mile south of, Bridge No. 44, over Salmon Creek, on west wing of south abutment; chiseled square	411.03
Zurich, in front of station; top of rail	441.5
Fairville, brick schoolhouse, District No. 2, 475 feet west of Northern Central Railway, in masonry foundation, 7 feet south of front entrance; aluminum tablet stamped "456 OSWGO"	456.802
Fairville, 0.9 mile south of, railroad bridge No. 40, over Mud Creek, west end of south abutment; chiseled square	414.21
Fairville, 2.9 miles south of, railroad bridge No. 37, over Mud Creek, west end of south abutment; chiseled square	416.35
Newark station, of New York Central and Hudson River Railroad, Northern Central Railway bridge over New York Central and Hudson River Railroad tracks, on top step, west end of south abutment; chiseled square	434.25
Newark, Charles Street Bridge over Erie Canal, towpath side, on bottom step of east wing; chiseled square	447.81
Newark, southwest corner of Charles and Miller streets, Miller street front of Baptist Church, 1 foot from northeast corner, in water table; aluminum tablet stamped "457 OSWGO"	457.570

MACEDON QUADRANGLE.

FORESTLAWN, EAST ALONG HIGHWAY TO ONTARIO.

Union Hill station, road crossing near; top of rail	425.7
Lakeside, on west wall of railroad culvert, north side of track, 600 feet west of station, on top step; chiseled square	421.56
Lakeside, highway crossing east of; top of rail	424.0
Ontario, in front of station; top of rail	414.6

WEBSTER, SOUTH ALONG HIGHWAY TO FAIRPORT.

	Feet.
Webster, at northeast corner of Union Academy building, in water table; aluminum tablet stamped "465 OSWGO"	466.225
Fairport, Main street, New York Central and Hudson River Railroad; top of rail	455.8
Fairport, Main street, West Shore Railroad; top of rail	455.6
Fairport, Union school, in water table of Church street front; aluminum tablet stamped "498 OSWGO"	498.983

ONTARIO, SOUTH VIA WALWORTH TO PALMYRA.

Walworth, at northwest corner of Walworth Academy building, in water table; aluminum tablet stamped "564 OSWGO"	564.785
Palmyra, 1 mile west of, Mud Creek Aqueduct, in buttress of south wing of west abutment; aluminum tablet stamped "446 OSWGO"	446.625

FAIRPORT, SOUTH TO BUSHNELL BASIN.

Bushnell Basin, Bridge No. 50 over Erie Canal, towpath abutment, inner face of west wing; bronze tablet stamped "465 OSWGO"	465.759

ROCHESTER QUADRANGLE.

CHARLOTTE, EAST ALONG THE ROME, WATERTOWN AND OGDENSBURG RAILROAD TO FORESTLAWN.

Charlotte, upper side of water table of old light-house, at southeast angle east of the south window; chiseled circle (United States Engineers' bench mark No. 1)	283.168
Charlotte, Genesee River, railroad swing bridge over, on southwest corner of west abutment of bridge, on top of parapet wall; chiseled square	257.16
Windsor, station of Rome, Watertown and Ogdensburg Railroad, cement foundation of first post of building east of station; chiseled square	278.46
Irondequoit, in front of Lake Shore Hotel; top of rail	270.2
Irondequoit Bay, Rome, Watertown and Ogdensburg Railroad bridge over outlet of, fourth step of east abutment, north side of track, on northeast corner; chiseled square	252.23
Forestlawn, 0.8 mile west of, railroad bridge over Webster road, on west abutment, north side of top step; chiseled square	266.49

ONTARIO, SCHUYLER, SENECA, STEUBEN, TOMPKINS, AND YATES COUNTIES.

GENEVA, GENOA, OVID, PENN YAN, AND PHELPS QUADRANGLES.

The elevations in the following list are based upon the readjustment of primary levels previously reported in Appendix to the Twenty-first Annual Report of the Director, United States Geological Survey. The leveling was done in 1899 under the direction of Mr. J. H. Jennings, topographer, as follows: On Geneva and Phelps quadrangles by Mr. C. H. Semper, levelman, and on the remainder jointly by Messrs. Semper and W. F. Hammond, levelmen. The standard bench marks are stamped "OSWEGO," in addition to figures of elevation, which are 1 foot low.

GENEVA QUADRANGLE.

GENEVA, NORTH TO LYONS.

	Feet.
East X, on southwest corner of stone step of station house on Lyons and Geneva Railroad; chiseled mark	478.65
Mitchell (West Junius), in north face wall of post-office at railroad crossing; bronze tablet stamped "491 OSWEGO 1899"	492.524

GENEVA, SOUTH ALONG LEHIGH VALLEY RAILROAD TO KENDAIA.

Geneva, in west face of St. Peter's Church, in water table; bronze tablet stamped "481 OSWEGO 1899"	481.524
Geneva, 1.9 miles south of, in west end of south abutment of Bridge No. 342, Lehigh Valley Railroad; copper bolt	465.52
Geneva, 6.3 miles south of, in top step west end of south abutment of Lake road overhead Bridge No. 337, Lehigh Valley Railroad; top of iron bolt	523.09
Varick, 1.8 miles south of, in northeast foundation stone of Lehigh Valley water tank, on west side of road; bronze tablet stamped "562 OSWEGO 1899"	563.385

MAYS POINT, SOUTH TO FAYETTE.

	Feet.
Mays Point, in west wing south abutment, in third step, of Mays Canal Bridge; bronze tablet stamped "396 OSWEGO 1899"	396.642
Seneca Falls, in south face wall of Mynderse Academy, North Park street; bronze tablet stamped "465 OSWEGO 1899"	466.066
Fayette post-office, in northwest corner of Dutch Reformed Church; bronze tablet stamped "612 OSWEGO 1899"	613.223

PHELPS QUADRANGLE.

NEWARK, SOUTH ALONG THE NORTHERN CENTRAL RAILWAY, TO PHELPS JUNCTION, THENCE SOUTHEAST TO EAST X.

Phelps Junction, 1.2 miles east of, on east end of stone abutment of aqueduct on south side of track, 15 feet from east end of wall; chisel mark	536.82
Phelps, southwest corner of schoolhouse, corner of Main and Banta streets; aluminum tablet stamped "542 OSWEGO 1899"	543.142

PHELPS JUNCTION, WEST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO MANCHESTER.

Phelps Junction, 1.2 miles west of, on south side of railroad, top of stone abutment of creek bridge; chisel mark	565.49
Clifton Springs, 3.9 miles west of, Lehigh Valley overhead bridge over Auburn branch of New York Central and Hudson River Railroad, north abutment; bronze tablet stamped "611 OSWEGO 1899"	612.031
Manchester, west abutment of Lehigh Valley Railroad bridge; top of bolt (railroad bench mark No. 359)	607.44

PHELPS JUNCTION, SOUTH ALONG THE NORTHERN CENTRAL RAILWAY TO BELLONA.

Stanley, in northwest corner of grain elevator at railway station; aluminum tablet stamped "903 OSWGO 1899"	904.027
Bellona, in southeast corner of Memorial Presbyterian Church on Main street; aluminum tablet stamped "731 OSWGO 1899"	732.207

STANLEY, SOUTHWEST ALONG THE LEHIGH VALLEY RAILROAD, TO RUSHVILLE.

Rushville, in northeast corner of Methodist Episcopal Church, in water table; tablet stamped "870 OSWEGO"	871.063

STANLEY, WEST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO CANANDAIGUA.

[The error distributed in this list is excessive.]

Ennerdale (Beula post-office), 30 feet south of station building, south side of railroad, on east margin of highway, in large bowlder; bronze tablet stamped "851 OSWEGO"	851.393

GENOA QUADRANGLE.

OVID CENTER, SOUTHEAST ALONG THE LEHIGH VALLEY RAILROAD, TO ITHACA.

Ovid Center, 2.5 miles south of, set in bridge seat of cattle pass, northeast side; top of iron rod (L. V. B. M. No. 325)	821.83
Farmer, corner of Main and Lodi streets, in northeast corner of Baptist Church; bronze tablet stamped "912"	912.420
Farmer, 0.7 mile south of, in north wall of cattle pass, east side; top of iron bolt stamped "B. M. No. 323"	843.88
Farmer, 2.4 miles south of, 600 feet north of highway, by fence west of railroad; top of iron bolt stamped "B. M. No. 322" (L. V.)	849.18
Covert, 1.4 miles south of, on west side of railroad, set in rock; top of iron pin stamped "320" (L. V.)	901.41
Covert, 1.9 miles south of, on west side of railroad, 600 feet south of highway, set in rock; top of iron pin (No. 319 L. V.)	882.08
Trumansburg, in south face of Union School and Academy; bronze tablet stamped "1000 OSWEGO 1899"	1,000.390
Trumansburg, first crossing west of station, set in rock on north side of track; iron pin (Lehigh Valley bench mark No. 318)	874.98
Willow Creek, 3 miles south of; top of iron plug set in bowlder (L. V. B. M. No. 311)	588.02

ITHACA, NORTH ALONG ROAD TO SCIPIO.

	Feet.
Ludlowville, in south end of bulkhead dam; aluminum tablet stamped "481 OSWEGO"...	482.334
Genoa, northeast corner of Hotel DeWitt, in top of retaining wall; aluminum tablet stamped "837 OSWEGO"...	838.591
Venice Center, north side of hotel building, in foundation stone; aluminum tablet stamped "998 OSWEGO"...	999.600

LUDLOWVILLE, NORTHWEST ALONG ROAD, TO AURORA.

Black Rock (Ellsworth post-office), iron bridge over Paines Creek, west abutment, in top of south wing; aluminum tablet stamped "723 OSWEGO"...	724.413

OVID QUADRANGLE.

HIMROD, SOUTH ALONG THE FALL BROOK RAILWAY, TO READING CENTER.

Himrod, 500 feet north of, on west end south abutment of bridge on Northern Central Railway; chisel mark...	799.10
Dundee, on foundation of railway water tank; chisel mark...	989.52

KENDAIA, SOUTH ALONG THE LEHIGH VALLEY RAILROAD, TO HECTOR.

Kendaia, 40 feet east of railroad on highway, in northwest corner of foundation wall of grain elevator; bronze tablet stamped "614 OSWEGO 1899"...	614.856
Kendaia, 2.2 miles south of, at railroad crossing, in south wall west side of cattle pass; top of iron bolt (No. 329, L. V.)...	648.46
Kendaia, 3.5 miles south of, 30 feet east of railroad at road crossing, in masonry road culvert; top of iron bolt (No. 328, L. V.)...	671.72
Willard, in masonry on west side of railroad in first highway south of station; top of iron bolt (No. 326, L. V.)...	709.09
Willard, 0.8 mile south of, in top of stone cattle pass, northwest side of railroad; top of iron bolt (No. 326, L. V.)...	722.15
Willard, 3.2 miles south of, in masonry of overhead bridge on northwest side; top of iron bolt (No. 323, L. V.)...	774.17
Lodi, 0.8 mile south of, overhead farm bridge on northwest wing in step; top of iron pin (No. 322, L. V.)...	801.22
Lodi, 1.9 miles south of, in top of masonry of creek bridge on east side of railroad; top of iron bolt (No. 321, L. V.)...	817.73
Lodi, 2.9 miles south of, in top of wall of cattle pass on northeast side of railroad; top of iron pin (No. 320, L. V.)...	829.82
Caywood, 0.2 mile south of, top of stone culvert masonry, on southeast side; top of iron bolt (No. 319, L. V.)...	839.37
North Hector, 0.5 mile south of station, 0.2 mile west of railroad, in masonry of basket factory, on crossroads; bronze tablet stamped "840 OSWEGO 1899"...	840.639

FAYETTE, SOUTH ALONG THE LEHIGH VALLEY RAILROAD, TO OVID CENTER.

Hayt Corners, 2.2 miles north of, on southwest side of railroad, 30 feet west of road; top of iron bolt stamped "B. M. 333" (L. V.)...	742.53
Hayt Corners, 1.6 miles north of, 1,500 feet east of railroad crossing, 20 feet east of red farm gate; top of iron bolt (B. M. 333 L. V.)...	740.08

TRUMANSBURG, WEST TO EAST STEAMBURG (SINGLE-SPUR LINE).

East Steamburg, northeast corner of Sherwood's house, 200 feet northwest of northwest corner of crossroads, in east wall; bronze tablet stamped "1544 OSWEGO"...	1,544.396

PENN YAN QUADRANGLE.

BELLONA, SOUTH ALONG THE NORTHERN CENTRAL RAILWAY TO HIMROD.

Benton, in northeast corner of Methodist Church; tablet stamped "1089 OSWEGO 1899"...	1,089.814
Penn Yan, in front face of Penn Yan Academy; aluminum tablet stamped "767 OSWEGO 1899"...	768.497
Milo Center, in east side of church on Main street; tablet stamped "947 OSWGO 1899"...	947.809

HIMROD, SOUTHWEST ALONG HIGHWAY (SINGLE-SPUR LINE).

Himrod, 4.5 miles southwest of, small bridge 0.75 mile south of forks of road, in face of east wing of north abutment; tablet stamped "1111 OSWEGO 1899"...	1,112.490

POTTER CENTER, SOUTH VIA BRANCHPORT TO CATAWBA.

	Feet.
Potter Center, in east end of north abutment of iron bridge over Flint Creek; tablet stamped "893 OSWEGO 1899"	893.490
Friend, on west abutment at north end of bridge; chiseled square	987.88
Branchport, 1,200 feet east of, in south end of west abutment of highway bridge, road to Penn Yan; tablet stamped "720 OSWEGO 1899"	720.702
Gulicksville (near Pulteney post-office), in west end north wall of iron bridge; aluminum tablet stamped "733 OSWEGO 1899"	733.615

CHEMUNG, LIVINGSTON, ONTARIO, SCHUYLER, STEUBEN, AND YATES COUNTIES.

BATH, ELMIRA, HAMMONDSPORT, NAPLES, AND WATKINS QUADRANGLES.

The elevations in the following list result from a readjustment of leveling reported in the Appendixes to the Twentieth and Twenty-first Annual Reports of the Director, United States Geological Survey, with additional work. For additional elevations on Elmira quadrangle, see "Precise leveling," pages 14–15, 22. The leveling on Elmira and Watkins quadrangles was done in 1898 under the direction of Mr. R. D. Cummin, topographer, by Mr. W. W. Gilbert, levelman; that on Hammondsport and Corning quadrangles and part of that on Bath quadrangle was done in 1899 under Mr. J. H. Jennings, topographer, by Mr. W. F. Hammond, levelman, and the leveling on Naples quadrangle and on the remainder of Bath quadrangle was done in 1900 under the direction of Mr. Jennings, by Mr. W. E. Green, levelman. The standard bench marks set by Hammond are stamped "OSWEGO," in addition to figures of elevation, mostly correct; and the others are stamped "D," with figures of elevation, mostly 1 foot below.

ELMIRA QUADRANGLE.

HORSEHEADS, ALONG THE NORTHERN CENTRAL RAILWAY TO WATKINS, THENCE TO BURDETT.

	Feet.
Horseheads, Lehigh Valley Railroad, opposite southeast line of Horseheads station; top of rail, main track	890.8
Horseheads, men's waiting room of Northern Central station; northwest corner of stone doorsill	900.11
Pine Valley, opposite south line of Pine Valley station; top of rail	891.0

WATKINS QUADRANGLE.

Millport, highway bridge over Catherine Creek at Millport House, in face of abutment at southwest corner; bronze tablet stamped "709 D"	710.627
Millport, at north line of station; top of rail	750.5
Montour Falls, 1.37 miles south of, south abutment of Northern Central Railway bridge over highway, on top stone; chisel mark	509.77
Montour Falls, opposite north line of station; top of rail	457.8
Montour Falls, old Schuyler County court-house, on foundation (base) of east pillar, front of court-house; chisel mark	467.23
Watkins, 0.5 mile south of station, on southeast corner of north abutment of Northern Central Railway bridge over Glen Creek; chisel mark	461.47
Watkins, Schuyler County court-house, in foundation at front, second course of stone from top, 3 feet south of northwest corner; bronze tablet stamped "476 D"	477.403
Burdett, at south line of station, Lehigh Valley Railroad; top of rail	1,003.3

BURDETT, SOUTHEAST ALONG THE LEHIGH VALLEY RAILROAD TO ODESSA, THENCE SOUTHWEST TO MILLPORT.

Burdett, 600 feet south of station; in north end of coping, west end of culvert under Lehigh Valley Railroad; copper bolt stamped "1002 D"	1,003.437
Burdett station, north end of coping, west end of culvert under Lehigh Valley Railroad; iron bolt (Lehigh Valley bench mark No. 309)	1,003.592
Burdett station, 1.37 miles south of, in top course of west end of south abutment of railroad bridge over intersection of highways; iron bolt (Lehigh Valley bench mark No. 307)	1,019.80
Burdett station, 3 miles south of, 150 feet north of milepost 307, in top stone of east end of small culvert under railroad; iron bolt (Lehigh Valley bench mark No. 306)	1,041.73
Burdett station, 4.12 miles south of, in face of west abutment of highway bridge over railroad, near north end of abutment, 0.12 mile south of milepost 306; iron pin (Lehigh Valley bench *mark No. 305)*	1,060.43

	Feet.
Odessa, 2 miles north of, in top stone at east end of culvert under railroad, 450 feet south of milepost 305; iron bolt (Lehigh Valley bench mark No. 304)	1,071.01
Odessa, 1.12 miles north of, in top stone at east end of culvert under railroad, 250 feet north of milepost 304; iron pin (Lehigh Valley Railroad bench mark No. 303)	1,078.48
Odessa, 0.12 mile north of, in coping of west end of south abutment of railroad bridge over highway; iron bolt (Lehigh Valley bench mark No. 302)	1,090.62
Odessa, at south end of station; top east of rail, west track	1,093.8
Odessa, 550 feet south of station, on west end of culvert under Lehigh Valley Railroad, in face of coping near north end; bronze tablet stamped "1053 D"	1,054.623

WATKINS, WEST VIA WATKINS STATION OF THE FALL BROOK DIVISION NEW YORK CENTRAL RAILROAD, TO TOWNSEND, THENCE SOUTH TO BEAVERDAMS, THENCE EAST TO MILLPORT.

Watkins, 0.5 mile north of post-office, Steuben street, on northwest corner of south abutment of bridge over stream; chiseled cross	624.87
Watkins, opposite south line of station; top of rail	1,003.4
Watkins Glen station, at south line of; top of rail	1,009.1
Watkins Glen station, railroad bridge over Glen Creek, on southeast corner of north abutment; chisel mark	1,009.42
Townsend, 2 miles south of, house of W. T. Beebe on east side of Beaverdams road, on northeast corner of top step of a flight of stone steps leading from the house to the road; chisel mark	1,342.56
Beaverdams, 0.75 mile south of, on abutment at northwest corner of iron highway bridge over small stream; chisel mark	1,234.32
Beaverdams, in foundation of house of David Beardsley, center of front, second course from top; aluminum tablet stamped "1262 D"	1,263.179
Kendalls, 1 mile northeast of, abutment at north corner of iron highway bridge over East Creek; chisel mark	1,260.93
Millport, 2.5 miles west of, Schoolhouse No. 9, Catlin Township, at southwest corner of building, on footing course of foundation; chisel mark	1,050.75

WATKINS STATION, NORTH ALONG HIGHWAY TO READING CENTER.

Reading Center, in foundation south side of Baptist Church, 4.5 feet from southeast corner, fourth course from top; bronze tablet stamped "1253 D"	1,253.894

BURDETT, NORTH ALONG THE LEHIGH VALLEY RAILROAD TO HECTOR.

Burdett station, 2.75 miles north of, east side of water tank, north pier west of track; iron bolt (Lehigh Valley bench mark No. 312)	963.81
Burdett station, 4 miles north of, in west end of south abutment of Lehigh Valley Railroad bridge over small stream, 100 feet north of milepost 314, back of house of J. B. Erway; copper bolt stamped "939 D"	940.461
Burdett station, 4 miles north of, in west end of south abutment of bridge over small stream; iron bolt (Lehigh Valley bench mark No. 313)	940.582

HAMMONDSPORT QUADRANGLE.

CATAWBA, SOUTHWEST TO HAMMONDSPORT.

Urbana, in east side of wine cellar; tablet stamped "734 OSWEGO 1899"	734.479
Hammondsport, 0.25 mile south of, in west end of north abutment of bridge over inlet to Lake Keuka; tablet stamped "718 OSWEGO 1899"	718.662

SAVONA, NORTHEAST VIA BRADFORD AND TYRONE, TO READING CENTER.

Savona, in south end of east abutment of highway bridge over Cohocton River; tablet stamped "1050 OSWEGO"	1,050.708
Bradford, in top of west end of south abutment of bridge; bronze tablet stamped "1100 OSWEGO 1899"	1,100.442
Tyrone, in west end of south wall of highway bridge at gristmill; bronze tablet stamped "1155 OSWEGO 1899"	1,155.231
Altay, 1,000 feet west of, in top of north wing of east abutment of highway bridge; bronze tablet stamped "1213 OSWEGO 1899"	1,213.661

COOPER, NORTH VIA EAST CAMPBELL AND MONTEREY, TO TYRONE.

Monterey, 60 feet northwest of iron bridge, in bowlder; bronze tablet stamped "1212 OSWEGO 1899"	1,212.778

SAVONA, VIA THE ERIE RAILROAD TO PAINTED POST.

	Feet.
Campbells, 700 feet north of station, south wall of railroad girder bridge, on east end of bridge seat; chisel mark	1,007.21
Painted Post, 2 miles north of, crossing of the Delaware, Lackawanna and Western and the Erie railroads; top of rail	949.16
Painted Post, 0.8 mile west of, in southeast corner of open bridge, on precise-level line; bronze tablet stamped "935 DUNKIRK 1898"	936.195

BATH QUADRANGLE.

HAMMONDSPORT, SOUTHWEST TO BATH, THENCE SOUTHEAST TO SAVONA.

Bath, county clerk's office, at left entrance, in water table; tablet stamped "1103 OSWEGO 1899"	1,103.427

COHOCTON, SOUTHEAST ALONG THE ERIE RAILROAD, TO BATH.

Wallace, Main street crossing; top of rail	1,230.7
Avoca, Main street crossing; top of rail	1,195.6
Avoca, crossing of Delaware, Lackawanna and Western Railroad, Main street; top of rail	1,193.9
Avoca, on southeast corner of Methodist Episcopal Church; bronze tablet stamped "1191 DUNKIRK"	1,191.664
Avoca, opposite station door; top of rail	1,194.9
Kanona, Main street railroad crossing; top of rail	1,149.1

KANONA, NORTH ALONG THE KANONA AND PRATTSBURG RAILWAY TO PRATTSBURG.

Kanona, north of station, at road crossing; top of rail	1,184.0
Wheeler, 50 feet north of station, at road crossing; top of rail	1,249.5
Wheeler, southeast corner of Frank Aull's house, in cellar wall; bronze tablet stamped "1262 DUNKIRK"	1,262.845

NAPLES QUADRANGLE.

RUSHVILLE, SOUTH ALONG RAILROAD TO NAPLES.

Middlesex, in water table of brick schoolhouse; bronze tablet stamped "735 D"	735.642
Middlesex, 100 feet northeast of station, at highway crossing; top of rail	717.0
Parish, in front of station; top of rail	695.8
Naples, Presbyterian Church, in northwest corner of front, in water table; bronze tablet stamped "799 DUNKIRK"	799.561

NAPLES, NORTHWEST ALONG HIGHWAY VIA HUNTS HOLLOW, TO COUNTY CORNER.

Pansy, 1 mile northwest of, 0.3 mile southwest of county corner, west side of road, on north retaining wall of approach to Wm. S. Washburn's barn; bronze tablet stamped "941 DUNKIRK"	941.698

NAPLES, EAST ALONG HIGHWAY TO ITALY, THENCE NORTH ALONG ITALY HOLLOW ROAD TO POTTER CENTER.

Italy, Methodist Episcopal Church wall; bronze tablet stamped "1121 DUNKIRK"	1,121.298

HUNTS HOLLOW, SOUTH ALONG HIGHWAY TO ATLANTA, THENCE SOUTHEAST ALONG THE ERIE RAILROAD TO COHOCTON.

Atlanta, Presbyterian Church, front wall, in water table; bronze tablet stamped "1317 DUNKIRK"	1,317.906
Atlanta, at crossing east of station; top of rail	1,317.0
Cohocton, Main street crossing; top of rail	1,286.5

ITALY, SOUTH TO PRATTSBURG.

Prattsburg, Presbyterian Church, in front wall; bronze tablet stamped "1470 DUNKIRK"	1,470.637

ONTARIO, MONROE, GENESEE, WYOMING, LIVINGSTON, AND STEUBEN COUNTIES.

BATAVIA, CANANDAIGUA, CALEDONIA, HONEOYE, NUNDA, AND WAYLAND QUADRANGLES.

The elevations in the following list are based upon the 1903 adjustment. For additional work on Caledonia and Nunda quadrangles see precise-level list, Charlotte to Hornellsville, elsewhere in this bulletin. The leveling on the Canandaigua quadrangle was done partly in

1899 under the direction of Mr. E. B. Clark, topographer, by Messrs. C. H. Semper and W. F. Hammond, levelmen; the remainder of work on the Canandaigua and work on Honeoye. Wayland, and part of Caledonia and Nunda quadrangles was done in 1901 under the direction of Mr. J. H. Jennings, topographer, by Mr. Semper; the remainder on Caledonia having been done in 1902 under the direction of Mr. A. C. Roberts by Mr. Wm. Kelly; the work on the Batavia and part on Nunda quadrangle was done in 1902 under the direction of Mr. W. H. Lovell, topographer, by Mr. Geo. Bailey, levelman, and the remainder on Nunda quadrangle was done in 1903 under Mr. Lovell by Mr. Geo. Seidel, levelman. The standard bench marks set in 1899 were stamped "OSWEGO," and those set in 1901–2 were stamped "ROCHESTER," in addition to figures of elevation.

CANANDAIGUA QUADRANGLE.

CANANDAIGUA, WEST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, TO EAST BLOOMFIELD.

	Feet.
Canandaigua Lake, at outlet; surface of water	685.0
Canandaigua, southwest corner of court-house, in foundation wall; bronze tablet stamped "766 OSWEGO 1899"	766.916
Holcomb, in front of station; top of rail	877
East Bloomfield, southeast corner of hotel; aluminum tablet stamped "1017 OSWEGO 1899".	1,016.760

MANCHESTER, WEST ALONG THE LEHIGH VALLEY RAILROAD TO FISHERS, THENCE NORTH TO BUSHNELL BASIN.

Tuttles, in top of large bowlder 500 feet south of station; bronze tablet stamped "599 OSWEGO 1899"	599.596
Victor, 1,500 feet east of, in south end of east abutment of railway cattle pass; bronze tablet stamped "559 OSWGO 1899"	560.099

WHEELER, SOUTH ALONG HIGHWAY VIA BRAGGVILLE TO BRISTOL CENTER (SINGLE-SPUR LINE).

Bristol Center, northwest corner of Methodist Episcopal Church, in foundation wall; bronze tablet stamped "931 OSWEGO 1899"	930.898

POINT 2 MILES EAST OF CANANDAIGUA, SOUTH ON EAST SIDE OF CANANDAIGUA LAKE (SINGLE-SPUR LINE).

Cottage City, on Lake road, east side of Canandaigua Lake, south wall of bridge, in top of east end; bronze tablet stamped "713 OSWEGO 1899"	713.594

HONEOYE QUADRANGLE.

EAST BLOOMFIELD, WEST ALONG THE NEW YORK CENTRAL RAILROAD, TO GENESEE VALLEY JUNCTION.

[The error distributed as far as Honeoye Falls is excessive.]

West Bloomfield, in front of station; top of rail	776.3
Honeoye Falls, Church street crossing; top of rail	668.1
Honeoye Falls, Union Free School, front face of north end; aluminum tablet stamped "657 ROCHESTER 1901"	656.414
West Rush, 200 feet south of station, west face of hotel, in foundation stone; bronze tablet stamped "571 ROCHESTER 1901"	570.282
West Rush, 100 feet west of station, road crossing; top of rail	557.9
Genesee Valley Junction (Rush Junction), grade crossing of the New York Central and Hudson River and the Erie railroads; top of rail	540.8

HONEOYE FALLS, SOUTH ALONG HIGHWAY TO LIVONIA CENTER, THENCE WEST TO LIVONIA, THENCE SOUTH TO SOUTH LIVONIA.

Lima, St. Rose's School, Rochester street, west face of north end; aluminum tablet stamped "849 ROCHESTER 1901"	849.065
Livonia Center, Lehigh Valley Railroad crossing, near station; top of rail	975.9
Livonia Center, Catholic Church, front face of southwest corner; bronze tablet stamped "1093 ROCHESTER 1901"	1,092.415
Livonia, Main street crossing of Erie Railroad; top of rail	1,024
South Livonia, road crossing near station; top of rail	1,182.1

LIVONIA CENTER, SOUTH ALONG RAILROAD TO HEMLOCK, THENCE SOUTHEAST ALONG HIGHWAY TO HONEOYE.

	Feet.
Hemlock, in front of station; top of rail	907.8
Honeoye, Congregational Church on Main street in west face; bronze tablet stamped "844 ROCHESTER 1901" (bench mark on a short spur line not checked)	843.433

M'QUEENS CROSSING, ALONG THE ERIE RAILROAD TO LIVONIA.

South Lima, southwest corner of cold-storage building at railroad station; bronze tablet stamped "912 ROCHESTER 1901"	911.607

WAYLAND QUADRANGLE.

SOUTH LIVONIA, ALONG THE ERIE RAILROAD TO WAYLAND, THENCE EAST TO ATLANTA.

Webster Crossing, 900 feet north of station, road crossing; top of rail	1,339.1
Webster Crossing, Hill & Webster's general store, north face near northeast corner; bronze tablet stamped "1363 ROCHESTER 1901"	1,362.428

POINT 2 MILES EAST OF HEMLOCK, SOUTH ALONG HIGHWAY TO SPRINGWATER.

Canadice, northwest corner of church sheds, at margin of roads, on large rock foundation; aluminum tablet stamped "1569 ROCHESTER 1901"	1,568.855
Tabor Corners, in west face of schoolhouse; aluminum tablet stamped "1863 ROCHESTER 1901"	1,862.338
Springwater, schoolhouse on road to station, in front face at northeast corner; aluminum tablet stamped "970 ROCHESTER 1901"	969.707

WAYLAND, WEST ALONG DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO GROVELAND.

Wayland, in west face of Lackawanna schoolhouse; aluminum tablet [a] stamped "1372 ROCHESTER 1901"	1,370.722
Wayland, road crossing near Delaware, Lackawanna and Western station; top of rail	1,360.5
Dansville, in front of station; top of rail	1,025.1
Dansville, station of Delaware, Lackawanna and Western Railroad, southeast corner of foundation; aluminum tablet stamped "1024 ROCHESTER 1901"	1,022.980

CALEDONIA QUADRANGLE.

AVON, ALONG THE ERIE RAILROAD, TO M'QUEENS CROSSING.

Avon, 0.57 mile south of station, on Bath branch of Erie Railroad, bridge over highway, in west end of south abutment; bronze tablet stamped "609 ROCHESTER"	608.977

GENESEE VALLEY JUNCTION, SOUTH ALONG THE ERIE RAILROAD, TO MOUNT MORRIS.

Avon, west side of station; platform	584.0
Ashantee, in front of station and creamery; top of rail	579.8
South Avon, road crossing near station; top of east rail	614.3
Geneseo, in front of station; top of east rail	596.2
Geneseo, 60 feet east of Erie freight house, 5 feet south of northwest corner of Delehanty's warehouse, in west face of foundation wall; aluminum tablet stamped "602 ROCHESTER"	602.290
Cuylerville, road crossing; top of east rail	579.2

AVON, WEST ALONG THE ERIE RAILROAD VIA CALEDONIA, TO LEROY.

Avon, 1.75 miles west of, bridge over Pennsylvania Railroad; top of rail	557.4
Caledonia, John Ball's storehouse opposite station, in northerly face of foundation wall; aluminum tablet stamped "669 ROCHESTER"	668.399
Leroy, junction of the Erie and the Buffalo, Rochester and Pittsburg railroads; top of rail	862.50
Leroy, "Church crossing" of Erie Railroad, at southwest corner of, at northeast corner of malthouse lettered "D," in easterly face; bronze tablet stamped "869 ROCHESTER"	868.385

MOUNT MORRIS, NORTHWEST ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD VIA GREIGSVILLE, TO LINWOOD.

Leicester, foundation wall of town hall, set in easterly face, 12 feet from northeast corner; bronze tablet stamped "661 ROCHESTER"	660.404
Leicester, highway crossing; north rail	656.2

[a] Schoolhouse rebuilt in 1905 and tablet set at same elevation.

	Feet.
Greigsville, in front of station; top of north rail	762.0
Craigs, highway crossing; top of north rail	865.0
Craigs, 50 feet west of station, on north side of track, near southwest corner of foundation wall of storehouse, on southerly face; bronze tablet stamped "866 ROCHESTER"	865.988
Linwood, in front of station; north rail	933.2

NUNDA QUADRANGLE.

GROVELAND, ALONG THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD, TO MOUNT MORRIS.

Groveland, first crossing east of station, north side of Delaware, Lackawanna and Western Railroad, in top of wall of cottage just east of steps; bronze tablet stamped "601 ROCHESTER"	600.780
Groveland, in front of station; top of rail	588.9
Mount Morris, grade crossing of the Erie and the Delaware, Lackawanna and Western railroads; top of rail	574.2
Mount Morris 1 mile north of, Delaware, Lackawanna and Western junction, grade crossing of Western New York and Pennsylvania Railway; top of north rail	587.6

MOUNT MORRIS, WEST ALONG PUBLIC ROAD TO GIBSONVILLE (SINGLE-SPUR LINE).

Mount Morris, Scoville House, in doorsill at north side of front entrance; bronze tablet stamped "627 ROCHESTER"	627.144
Gibsonville, at road forks near old store, in bowlder sunk in ground; bronze tablet stamped "726 ROCHESTER"	726.182

CANASERAGA, NORTH ALONG PUBLIC ROAD TO OSSIAN (SINGLE-SPUR LINE).

Ossian, east corner of foundation wall of Dr. T. H. Lamont's residence; aluminum tablet stamped "1345 ALBANY 1903"	1,343.826

BATAVIA QUADRANGLE.

LEROY, WEST ALONG THE NEW YORK CENTRAL RAILROAD TO BATAVIA, THENCE SOUTH TO ATTICA.

Stafford, crossing just west of station; top of north rail	900.4
Batavia (Attica branch of New York Central), 0.5 mile from station, in northeast abutment of railroad bridge; bronze tablet stamped "893 ROCHESTER"	892.386

ATTICA, ALONG THE ERIE RAILROAD EAST TO LINDEN, THENCE SOUTH TO WARSAW.

Dale, 0.25 mile north of station, in southeast abutment of railroad bridge over highway; bronze tablet stamped "1208 ROCHESTER"	1,207.654
Dale, in front of station; top of rail	1,215.0
Warsaw, 1 mile north of, 400 feet north of intersection with road north and south, in east wall of pipe culvert; aluminum tablet stamped "1008 ROCHESTER"	1,008.684

WARSAW, NORTH ALONG THE BUFFALO, ROCHESTER AND PITTSBURG RAILWAY, VIA PEARL CREEK AND PAVILION CENTER, TO LEROY.

Pearl Creek, 800 feet north of station, southeast abutment of railroad bridge over creek; bronze tablet stamped "954 ROCHESTER"	954.333
Pavilion Center, 400 feet south of, bridge over highway, in top of west end of north wall; bronze tablet stamped "953 ROCHESTER"	953.237
Leroy, West Main street crossing; top of rail	887.0

ALLEGANY, ERIE, GENESEE, LIVINGSTON, AND WYOMING COUNTIES.

ANGELICA, ATTICA, BUFFALO, DEPEW, FRANKLINVILLE, AND PORTAGE QUADRANGLES.

The elevations in the following list are based upon the 1903 adjustment of the precise-level net. The leveling was done in 1903 under the direction of Mr. J. H. Jennings, topographer, except a portion on Angelica quadrangle, which was done under the direction of Mr. W. H. Lovell, topographer, by Mr. Geo. Seidel, levelman. All standard bench marks are stamped with the letters "ALBANY" in addition to the figures of elevation.

ATTICA QUADRANGLE.

ATTICA, ALONG RAILROAD SOUTH TO VARYSBURG, THENCE ALONG HIGHWAY WEST TO HARRIS.

	Feet.
Attica, 0.2 mile west of station, on south side of Erie Railroad, in east abutment of railroad bridge; bronze tablet stamped "990 ROCHESTER"	990.187
Arcade, railroad crossing; top of rail	974.
Varysburg, southeast corner of foundation wall of Baptist Church; bronze tablet stamped "1113 ALBANY 1903"	1,113.072
Harris, north side of road, about 35 feet south of T. Dorshide's hotel, in large rock; bronze tablet stamped "1306 ALBANY 1903"	1,305.795

CRITTENDEN, EAST ALONG THE NEW YORK CENTRAL AND HUDSON RIVER RAILROAD TO CORFU, THENCE ALONG HIGHWAY TO DARIEN, THENCE EAST ALONG RAILROAD TO ATTICA.

Crittenden, 0.2 mile east of; New York Central Railroad bench mark at milestone 419	846.89
Crittenden, 1.2 miles east of; New York Central Railroad bench mark at milestone 418	856.00
Corfu, 2.1 miles west of; New York Central Railroad bench mark at milepost 417	878.36
Corfu, 1.1 miles west of; New York Central Railroad bench mark at milestone 416	873.28
Corfu, 0.1 mile west of; New York Central Railroad bench mark at milestone 415	862.92
Corfu, southwest corner of foundation wall of Catholic Church; bronze tablet stamped "854 ALBANY 1903" (bench mark on single-spur line)	854.445
Lehigh Valley Railroad crossing; top of rail	878
Delaware, Lackawanna and Western Railroad crossing; top of rail	909
Darien Center, southeast corner of foundation wall of Allegheny Hotel; aluminum tablet stamped "1011 ALBANY 1903"	1,011.207
Darien, Erie Railroad station; top of rail	1,011.8
Griswold, 500 feet southwest of station, north side of track; coping stone of abutment of railroad bridge	1,032.86
Griswold, road crossing at station; top of rail	1,036

DEPEW QUADRANGLE.

DARIEN, WEST ALONG ERIE RAILROAD TO ALDEN.

Alden, in foundation of standpipe of village waterworks; aluminum tablet stamped "865 ALBANY 1903"	865.582

HARRIS, ALONG HIGHWAY WEST TO ORCHARD PARK.

Wales Center, 2.2 miles east of; north end of west abutment of iron bridge	1,045.70
Wales Center, 150 feet east of covered bridge, northeast corner of foundation wall of George Kelver's residence; aluminum tablet stamped "898 ALBANY 1903"	897.753
East Aurora, in brick wall to left of main entrance of schoolhouse; aluminum tablet stamped "926 ALBANY 1903"	926.235
East Aurora, 1.5 miles west of, iron bridge across Cazenovia Creek; end of west abutment	832.61
Orchard Park, southeast corner of Briggs Brothers block, in brick foundation; aluminum tablet[a] stamped "868 ALBANY 1903"	868.933

EAST AURORA, NORTHWEST ALONG THE PENNSYLVANIA RAILROAD AND HIGHWAY TO EBENEZER.

Elma station, Elma Center post-office road crossing; top of rail	814.2
Spring Brook, railroad crossing; top of rail	748
Blossom (Upper Ebenezer), in foundation wall of schoolhouse, District No. 8; aluminum tablet stamped "672 ALBANY 1903"	672.087

WILLIAMSVILLE, EAST ALONG PUBLIC ROAD VIA CLARENCE TO MILLGROVE.

Williamsville, northwest corner of foundation wall of Mansion House; bronze tablet stamped "665 ALBANY 1903"	665.022
Clarence, main entrance of Parker High School; aluminum tablet stamped "752 ALBANY 1903"	752.704
Millgrove, 1.1 miles north of; east end of north abutment of small bridge	777.45

MILLGROVE ALONG THE NEW YORK CENTRAL RAILROAD TO CRITTENDEN.

Wende, road crossing at station; top of rail	791
Wende, 1.1 miles east of station; New York Central Railroad bench mark at milepost 421	811.38
Crittenden, 0.8 mile west of; New York Central Railroad bench mark at milestone 420	825.56

[a] This elevation is by a single line from a checked elevation at Big Tree, which is nearer than East Aurora, from which also by single line an elevation 0.9 foot less was derived.

BUFFALO QUADRANGLE.

EBENEZER, NORTH ALONG HIGHWAY TO WILLIAMSVILLE.

	Feet.
Ebenezer, railroad crossing at station; top of rail	636.3
Gardenville, 100 feet north of iron bridge at street crossing; rock on northwest corner	630.57
Erie Railroad crossing; top of rail	636
Delaware, Lackawanna and Western Railroad crossing; top of rail	641
Forks, 0.2 mile west of station, south side of New York Central tracks, Evangelical Church, to right of main entrance, in foundation wall; bronze tablet stamped "662 ALBANY 1903"	662.079
New York Central Railroad bench mark at milepost 433	657.69
New York Central Railroad bench mark at monument No. 90	654.75

PORTAGE QUADRANGLE.

NUNDA, WEST ALONG THE PENNSYLVANIA RAILROAD TO PORTAGE, THENCE NORTH ALONG THE ERIE RAILROAD TO SILVER LAKE JUNCTION, THENCE NORTHEAST ALONG THE SILVER LAKE RAILWAY TO PERRY, THENCE WEST OVER PUBLIC ROAD TO SOUTH WARSAW, THENCE NORTH ALONG THE BUFFALO, ROCHESTER AND PITTSBURG RAILWAY TO WARSAW.

Portageville post-office, west end of south abutment of Pennsylvania Railroad bridge across Genesee River; bronze tablet stamped "1131 ALBANY 1903"	1,131.174
Castile, southwest corner of coping stone of water plug; bronze tablet stamped "1395 ALBANY 1903"	1,394.847
Castile, in front of station; top of rail	1,395
Summit, highest point of Erie Railroad (Buffalo division); top of rail	1,424.4
Silver Springs, road crossing at station; top of rail	1,402
Silver Lake Junction, about 500 feet west of, north side of Erie track, in pier of Buffalo, Rochester and Pittsburg Railway bridge; bronze tablet stamped "1401 ALBANY 1903" (on single-spur line)	1,401.533
Chace station, road crossing; top of rail	1,370
Fairview, in front of station; top of rail	1,364
Perry, road crossing; top of rail	1,366
Perry, north end of west abutment of railroad bridge at station, in top stone; bronze tablet stamped "1362 ALBANY 1903"	1,362.365
South Warsaw, north end of east abutment of bridge across Oatka Creek; bronze tablet stamped "1066 ALBANY 1903"	1,065.823
Warsaw, road crossing at station; top of rail	1,116

SOUTH WARSAW, WEST ALONG PUBLIC ROAD TO WETHERSFIELD SPRINGS, THENCE SOUTH VIA HARDYS TO PIKE, THENCE EAST TO PORTAGE.

Wethersfield Springs, culvert at west side of road; top of stone	1,720.606
Hermitage, 250 feet north of road leading to Gainesville, 300 feet west of East Koy Creek, 200 feet north of Blodgett's office, in bowlder; bronze tablet stamped "1658 ALBANY 1903"	1,658.056
Hardys, in front of station; top of rail	1,686.1
Pike Five Corners; west end of south abutment of iron bridge	1,595.769
Pike, iron bridge across Wiscoy Creek, about center of east abutment, north side of driveway; bronze tablet stamped "1546 ALBANY 1903"	1,545.986

ANGELICA QUADRANGLE.

PORTAGE, SOUTHWEST ALONG THE PENNSYLVANIA RAILROAD TO CUBA.

Fillmore, main entrance of Dingman House, coping stone of stone wall; aluminum tablet stamped "1213 ALBANY 1903"	1,213.069
Houghton, road crossing at station; top of rail	1,210
Caneadea, 0.6 mile north of, west side of track, old canal lock; foundation rock	1,228.856
Caneadea, road crossing; top of rail	1,238
Caneadea, 500 feet south of station, west end of north abutment of railroad bridge; aluminum tablet stamped "1236 ALBANY 1903"	1,236.916
Oramel, road crossing at station; top of rail	1,264
Belfast, 2.1 miles south of, west side of track at railroad crossing; top stone of culvert	1,350.810
Black Creek, road crossing at station; top of rail	1,489
Black Creek, southwest corner of foundation wall of Congregational Church; aluminum tablet stamped "1517 ALBANY 1903"	1,517.944

CANEADEA, EAST ALONG PUBLIC ROAD TO ALLEN CENTER (SINGLE-SPUR LINE).

Allen Center, 0.2 mile west of, north side of road, in foundation wall of Wm. Burk's residence; *aluminum tablet stamped* "1636 ALBANY 1903"	1,636.189

BELFAST, SOUTHEAST ALONG PUBLIC ROAD TO BELVIDERE, THENCE ALONG ERIE RAILROAD TO BELMONT.

	Feet.
Belfast, corner of Main street, northeast corner of foundation to Belfast House; aluminum tablet stamped "1313 ALBANY 1903"	1,313.140
Angelica, crossing at station; top of rail	1,440
Angelica, foundation of Shawmut railroad office building, on Depot street; aluminum tablet stamped "1440 ALBANY 1903" (on single-spur line)	1,439.990
Belvidere, foundation wall under bay window of Mrs. S. H. Whitcomb's residence; aluminum tablet stamped "1371 ALBANY 1903"	1,371.272

FRANKLINVILLE QUADRANGLE.

CANEADEA, WEST ALONG PUBLIC ROAD TO RUSHFORD (ON SPUR LINE).

Rushford, northeast corner of foundation wall of schoolhouse; aluminum tablet stamped "1517 ALBANY 1903"	1,517.343

ALLEGANY AND CATTARAUGUS COUNTIES.

BELMONT, OLEAN, AND SALAMANCA QUADRANGLES.

The elevations in the following list result from a readjustment of leveling reported in the Appendixes to the Eighteenth and Twentieth Annual Reports of the Director, United States Geological Survey. For additional elevations on these quadrangles refer to "Precise-level line Dunkirk to Albany." The leveling on Olean and Belmont quadrangles was done in 1896 under the direction of Mr. F. Sutton, topographer; that on Salamanca quadrangle was done in 1897 under the direction of Mr. J. H. Jennings, topographer, both by Mr. E. L. McNair, topographer. The standard bench marks on Olean and Belmont quadrangles are stamped with figures of elevation, mostly 7 feet too great, and without datum letters, and those on Salamanca quadrangle were stamped with letter "S," and figures of elevation 5 feet too great. These errors are due to the erroneous railroad datums used when field work was done.

BELMONT QUADRANGLE.

CUBA SOUTHEAST TO CLARKSVILLE.

	Feet.
Clarksville, at M. M. Congdon's residence, in stone horse block; copper bolt stamped "U. S. G. S. B. M. 1604 ft."	1,596.063

OLEAN QUADRANGLE.

OLEAN, SOUTHEAST TO PORTVILLE, THENCE NORTHEAST TO CLARKSVILLE.

Olean, in front of Western New York and Pennsylvania Railway station; top of rail	1,428.5
Olean, city building, Union street side, in foundation stone just beneath water table in northwest corner of building; bronze tablet stamped "1459"	1,451.790
Westons Mills, Haskell Creek highway bridge, near southeast corner of east abutment; top of coping stone	1,425.79
Allegheny River highway bridge; west end of north abutment	1,433.05
Portville, in front of Western New York and Pennsylvania Railway station; top of rail	1,436.4
Portville, Presbyterian Church, in upper stone step at entrance; copper bolt stamped "U. S. G. S. B. M. 1438 Ft."	1,432.143
Obi, 1 mile southwest of, Seventh Day Baptist Church, 85 feet from church doors, 10 feet from center of road, 3 feet from fence, on land belonging to Mrs. E. B. Adams, in large flat rock, on west side of road; copper bolt stamped "U. S. G. S. B. M. 1547 ft."	1,539.910

OLEAN, NORTH VIA HINSDALE TOWARD ISCHUA.

Hinsdale, 1.5 miles south of Olean Creek Bridge, Faye Hollow highway, in capstone of bridge foundation; copper bolt stamped "U. S. G. S. B. M. 1449 ft."	1,442.079
Scott, 2.1 miles north of, west side of Hinsdale-Ischua road, in base of stone wall, under south side of barn of Harris Johnson, in large flat stone; copper bolt stamped "U. S. G. S. B. M. 1544 Ft."	1,536.378

SALAMANCA QUADRANGLE.

SOUTH VANDALIA, SOUTHEAST THROUGH CHIPMUNK OIL FIELDS, TO KNAPP CREEK.

Chipmunk, 0.8 mile south of, 55 feet south of road east and 140 feet north of M. Kelly's white house, 2 feet outside of fence on west side of road; copper bolt in bowlder stamped "1529 *Ft. S.*"	1,524.144
Knapp Creek, in front of electric-railroad station; top of rail	2,342.1

CARROLLTON, SOUTH VIA LIMESTONE TO NEW YORK-PENNSYLVANIA STATE LINE.

	Feet.
South Carrollton, 1.2 miles south of, iron highway bridge crossing Allegheny River, on bridge abutment 8 feet from southeast corner; chiseled square	1,397.23
South Carrollton, 2 miles south of, 4 miles north of Limestone, in large bowlder nearly buried in ground on west side of road, between it and ditch, near entrances to pasture fields on each side of road; copper bolt stamped "1410 Ft. S"	1,405.718
Limestone, 2 miles south of, 9 feet from southwest corner of iron bridge over stream just inside State line, in stone abutment; chiseled square	1,413.47
Limestone, 2.3 miles south of, on west side of road, near oil derrick, opposite telephone pole 6050, on top of State-line monument; chiseled square	1,450.83

KILLBUCK, NORTHEAST TO GREAT VALLEY, THENCE EAST TO HUMPHREY.

Killbuck, 3.9 miles north of, at southwest corner of iron bridge across Wrights Creek at about 0.25 mile above its junction with Great Valley Creek, in stone abutment; copper bolt stamped "1456 Ft. S"	1,451.923
Great Valley, 2.52 miles southeast of, northwest corner of iron bridge across Wrights Creek, near a white church, on stone abutment; chiseled square	1,513.61
Humphrey, 1.7 miles west of, 4 feet from southeast corner of iron bridge across Wrights Creek, on stone abutment; chiseled square	1,548.98
Humphrey, W. J. Sherman's hotel, in stone doorstep in front of porch, west side; copper bolt stamped "1626 Ft. S"	1,621.444

CATTARAUGUS AND CHAUTAUQUA COUNTIES.

CHAUTAUQUA, CHERRY CREEK, CLYMER, DUNKIRK, JAMESTOWN, NORTHEAST, REDHOUSE, AND WESTFIELD QUADRANGLES..

The elevations in the following list are based upon an aluminum tablet in the water table of St. Mary's Home and School at Dunkirk, the elevation of which is now accepted as 598.937 feet above mean sea level. A portion of the work here given was previously reported in the Appendix to the Twentieth Annual Report of the Director United States Geological Survey, pages 310–313. For additional elevations on Cherry Creek and Redhouse quadrangles see "Precise leveling."

The leveling on Dunkirk, Cherry Creek, and Westfield quadrangles was done in 1898 under the direction of Mr. Frank Sutton, topographer, by Mr. E. L. Faison, levelman; that on Clymer, Chautauqua, and most of Jamestown quadrangles was done in 1902 under the direction of Mr. A. C. Roberts, topographer, by Mr. G. M. Dimmick, levelman, except part on Chautauqua quadrangle done by Mr. Wm. Kelley, levelman; and work on Redhouse and the remainder on Chautauqua quadrangle was done in 1903 under the direction of Mr. W. H. Lovell, topographer, by Mr. Geo. Seidel, levelman. All standard bench marks are stamped with "D" or "DUNKIRK" in addition to figures of elevation.

DUNKIRK QUADRANGLE.

DUNKIRK TO FREDONIA, ALONG THE DUNKIRK, ALLEGHENY VALLEY AND PITTSBURG RAILROAD.

	Feet.
Dunkirk, extreme northwest corner of Nelson block; top of water table	588.866
Dunkirk, Elk street crossing of Lake Shore and Michigan Southern Railway; top of rail	594.6
Dunkirk, 2 miles south of, Dunkirk, Allegheny Valley and Pittsburg Railroad culvert No. 3; extreme northwest corner	664.37
Fredonia, in front of Dunkirk, Allegheny Valley and Pittsburg Railroad station; top of rail.	767.8

FREDONIA, VIA LAONA, LILLYDALE, CASSADAGA, AND STOCKTON, TO MAYVILLE.

Laona, on west side of railroad bridge over Canadaway Creek, in top stone of north abutment; bronze tablet stamped "817 D"	817.926
Lillydale, 1.5 miles north of, southwest corner of abutment, south end of Skidmore viaduct; chiseled square	1,295.60
Lillydale, in front of Dunkirk, Allegheny Valley and Pittsburg station; top of rail	1,312.9
Stockton, 500 feet west of Chriss's Hotel, east side of stone foundation of blacksmith shop on Mayville street, 4 feet above ground; bronze tablet stamped "1316 D"	1,317.521
Mayville, at Jamestown Junction, west side of cemetery, highway bridge over Black Brook, in top stone at north end of east abutment; bronze tablet stamped "1324 D"	1,324.865
Mayville, top of bottom step of front of court-house; chiseled square	1,462.49

	Feet.
Mayville, schoolhouse grounds, in north meridian monument; bronze tablet stamped "1500 D (?)"	1,500.670
Mayville, schoolhouse grounds, in south meridian monument; bronze tablet stamped "1499 D" (?)	1,499.500

JAMESTOWN JUNCTION, SOUTHEAST ALONG THE JAMESTOWN, CHAUTAUQUA AND LAKE ERIE RAILWAY, TO WOOGLIN.

Hartfield; top of station platform	1,315.7
Wooglin, in front of station; top of south rail	1,350.2

WEST PORTLAND, NORTHEAST VIA BROCTON TO FREDONIA.

West Portland, on northeast corner of second step of red brick church; cross mark	774.75
Brocton, at crossing of Western New York and Pennsylvania Railway; top of rail	745.1
Brocton, 1 mile north of, 0.25 mile east of station, in south side of center pier of double arch (stone) of Lake Shore Railway bridge over Slippery Rock Creek; copper bolt stamped "667 D"	668.518
Fredonia, south entrance to clothing store in Columbia Hotel; top of south stone step	728.52

CHERRY CREEK QUADRANGLE.

CASSADAGA, EAST TO CHERRY CREEK.

Charlotte Center, 1.6 miles east of, 640 feet east of road turning off south, in stone 12 feet north of road, 6 inches above ground; copper bolt stamped "1915 D"	1,915.887
Cherry Creek, in west side of north abutment of Main street iron bridge over Cherry Creek; copper bolt stamped "1309 D"	1,310.510
Cherry Creek, 400 feet south of station, northwest corner of abutment of plate-girder bridge over Erie Railroad; cross mark on top	1,293.77

CHERRY CREEK, NORTHWEST VIA ARKWRIGHT TO LAONA.

Arkwright Center, 0.9 mile east of, 15 feet north of center of road, large stone in place, 2 feet above ground; copper bolt stamped "1570 D"	1,571.006

WESTFIELD QUADRANGLE.

MAYFIELD, NORTH TO PROSPECT, THENCE WEST TO WESTFIELD, THENCE NORTHEAST TO WEST PORTLAND.

Prospect, foundation of Western New York and Pennsylvania Railway station, in northeast corner; bronze tablet stamped "1213 D"	1,214.183
Westfield, in northwest corner of masonry foundation of public-school building, 2.5 feet above ground; bronze tablet stamped "748 D"	748.900

MAYVILLE, WEST TO VOLUSIA.

Volusia, foundation of Methodist Church, in front face of south side; bronze tablet stamped "1557 DUNKIRK 1902"	1,556.785

REDHOUSE QUADRANGLE.

KENNEDY, EAST ALONG RAILROAD TO RANDOLPH (SINGLE-SPUR LINE).

Randolph, west end of north abutment of bridge west of station, top stone; bronze tablet stamped "1298 DUNKIRK"	1,298.010

JAMESTOWN QUADRANGLE.

JAMESTOWN, NORTHEAST ALONG THE ERIE RAILROAD TO CHERRY CREEK.

Jamestown, 1.42 miles east of, railroad bridge over Chautauqua Outlet, on center of west abutment; square	1,302.34
Kennedy, 750 feet south of station, east end of north abutment of Erie Railroad bridge; bronze tablet stamped "1257 DUNKIRK 1902"	1,257.353
Kennedy, in front of station; top of east rail	1,260.6
Conewango, in front of station; top of east rail	1,282.8
Conewango, residence of Doctor Smith, north face, east end, in foundation wall; bronze tablet stamped "1293 DUNKIRK 1902"	1,293.321

FALCONER, NORTH ALONG THE DUNKIRK, ALLEGHENY VALLEY AND PITTSBURG RAILROAD, TO GERRY, THENCE ALONG HIGHWAY EAST TO ELLINGTON.

Falconer, 500 feet south of station, top of east end of north abutment of bridge; aluminum *tablet stamped "1258 DUNKIRK 1902"*	1,257.717

	Feet.
Gerry, in front of station; top of east rail	1,296.1
Gerry, in foundation wall of schoolhouse, District No. 1, 9 feet from southeast corner, east face; bronze tablet stamped "1309 DUNKIRK 1902"	1,308.729
Ellington, foundation wall of Congregational Church, in north face of east end; bronze tablet stamped "1380 DUNKIRK 1902"	1,379.945

JAMESTOWN, SOUTHEAST ALONG HIGHWAY VIA KIANTONE TO FENTONVILLE (CHECKED BY LINE FROM PENNSYLVANIA).

Kiantone (6 miles southeast of Jamestown), in foundation wall of church, center of south face; aluminum tablet stamped "1493 DUNKIRK"	1,493.126
Fentonville, road crossing; top of rail	1,248
Fentonville, 500 feet east of station, northwest corner of foundation wall of Ira Adam's house; bronze tablet stamped "1255 DUNKIRK"	1,255.414

CHAUTAUQUA QUADRANGLE.

WOOGLIN, SOUTHEAST ALONG THE JAMESTOWN, CHAUTAUQUA AND LAKE ERIE RAILWAY, VIA CHAUTAUQUA POINT, TO JAMESTOWN.

Chautauqua Point, in front of station; top of south rail	1,323.2
Dewittville, in front of station; top of south rail	1,314.3
Dewittville, foundation wall of Methodist Church, 7.5 feet west of southeast corner, in southern side; bronze tablet stamped "1319 DUNKIRK"	1,319.864
Starr Farm, in front of station; top of south rail	1,314.4
Midway Grove; top of south rail	1,317.7
Midway, highway crossing near station; top of south rail	1,319.8
Warners, in front of station; top of south rail	1,315.0
Giffords, in front of station; top of south rail	1,313.0
Bay View, in front of station platform; top of south rail	1,323.0
Bemus Point, in front of station; top of south rail	1,358.8
Bemus Point, 440 feet south of station, west side of Cemetery street, on the southerly side of A. G. Barrett's residence, in foundation wall of bay window; bronze tablet stamped "1345 DUNKIRK"	1,345.529
Phillips Mills, in front of station; top of south rail	1,316.6
Colburns, in front of station; top of south rail	1,321.0
Belleview, in front of station; top of south rail	1,321.6
Driftwood, in front of station; top of south rail	1,323.5
Griffith, in front of station; top of south rail	1,318.9
Greenhurst, in front of station; top of south rail	1,324.3
Fluvanna, in front of station; top of south rail	1,313.0
Fluvanna, Chautauqua Lake, June 13, 1902; water surface	1,308
Jamestown, Isabella avenue; top of south rail	1,311.3

BEMUS POINT, ALONG HIGHWAY NORTHEAST TO ELLERY (SINGLE-SPUR LINE).

Ellery, Cowden Brothers' store, in foundation wall, north face; bronze tablet stamped "1758 DUNKIRK 1902"	1,758.450

JAMESTOWN, SOUTHWEST ALONG THE ERIE RAILROAD TO BROKENSTRAW (GRANT STATION), THENCE NORTH ALONG HIGHWAY TO PANAMA, THENCE WEST TO NORTH CLYMER.

Jamestown, 3,750 feet west of, north end of west abutment of Erie Railroad bridge over Chautauqua Outlet, in top step but one; bronze tablet stamped "1324 DUNKIRK 1902"	1,324.462
Lakewood, highway crossing near station; top of north rail	1,352.1
Lakewood, post-office, on east side of Chautauqua avenue, 4 feet east of southwest corner of R. H. Maxim's building (post-office), on south side; aluminum tablet stamped "1362 DUNKIRK"	1,361.810
Ashville, in front of station; north rail	1,353.3
Watts Flats, in front of station; top of north rail	1,452.7
Brokenstraw, 3.18 miles northwest of, bridge over Brokenstraw Creek, on east end of north abutment; chiseled square	1,465.04
Panama, Hotel Berny, north face, east corner, in water table; aluminum tablet stamped "1551 DUNKIRK"	1,550.667

CLYMER QUADRANGLE.

CLYMER, NORTH ALONG THE WESTERN NEW YORK AND PENNSYLVANIA RAILWAY, TO MAYVILLE.

	Feet.
Clymer, in front of station; top of east rail	1,472.1
North Clymer, east end of foundation wall of Methodist Episcopal Church, south face; bronze tablet stamped "1582 DUNKIRK 1902"	1,582.091
Panama (North Clymer), in front of station; top of east rail	1,562.0
Sherman, in front of station; top of north rail	1,581.5
Summerdale, at highway crossing; top of east rail	1,638.7
Mayville, in front of station; top of east rail	1,314.2
Mayville, Chautauqua Lake; water surface	1,310

SHERMAN STATION, WEST TO SHERMAN (SINGLE-SPUR LINE).

Sherman, 0.72 mile west of station, highway bridge over Finch Creek, west end of north abutment; bronze tablet stamped "1538 DUNKIRK 1902"	1,538.226

CLYMER, WEST ALONG HIGHWAY TO MARVIN, THENCE NORTH TO POINT 9 MILES NORTH OF FINDLAY LAKE, THENCE INDIRECTLY EASTWARD TO POINT 3 MILES WEST OF MAYVILLE.

Clymer, 1.3 miles west of station, west end of foundation wall of Baptist Church, front face; bronze tablet stamped "1468 DUNKIRK 1902"	1,468.349
Marvin, 0.6 mile north of, highway bridge over Finch Creek, top of north end of west abutment; bronze tablet stamped "1388 DUNKIRK 1902"	1,387.907
Findley Lake, Aug. 9, 1903; water surface	1,421
Findley Lake, west corner of foundation wall of Methodist Church, in front face; aluminum tablet stamped "1429 DUNKIRK 1902"	1,428.655

NORTHEAST QUADRANGLE.

Stateline (village), 2.2 miles south of, 1,000 feet south of three corners, in east end of north abutment of small bridge; bronze tablet stamped "1293 DUNKIRK 1902"	1,293.049

GENESEE AND MONROE COUNTIES.

BROCKPORT AND HAMLIN QUADRANGLES.

The elevations published in the following list are based on a bronze tablet set in the foundation wall of the Normal School at Brockport and stamped "B 538." The elevation of this bench mark above mean sea level is derived from the nearest bench mark of the State engineer. The height of this bench mark is now accepted as 539.231 feet above mean sea level. The work was previously reported upon in the Appendix to the Nineteenth Annual Report of the Director, United States Geological Survey.

The leveling was done in 1897 under the direction of Messrs. J. H. Jennings and E. B. Clark, topographers, by Mr. E. L. McNair, levelman. The standard bench marks are stamped with the letter "B" in addition to figures of elevation.

HAMLIN QUADRANGLE.

BROCKPORT, NORTH TO HAMLIN, THENCE EAST TO HILTON, THENCE SOUTH TO SPENCERPORT.

	Feet.
Hamlin, Hamlin House, 6 feet from southwest corner, in ground inside fence; iron post stamped "B 337"	337.707
Hilton, house of Dr. J. J. Williams, in foundation wall under bay window; bronze tablet stamped "B 284"	285.259

BROCKPORT QUADRANGLE.

AT SPENCERPORT.

Spencerport, Amity street, Bridge No. 99, in center of abutment facing towpath and canal; bronze tablet stamped "514 B"	514.749
Spencerport, New York Central and Hudson River Railroad station; southeast corner of door step at east end of building	528.96
Spencerport, at east end of New York Central and Hudson River Railroad station; top of rail	526.3

BROCKPORT, SOUTH TO POINT 1 MILE SOUTH OF SWEDEN CENTER.

	Feet.
Brockport, east end of towpath abutment of Park avenue canal bridge; lower step (Erie Canal B. M. No. 107, State engineer's B. M. No. 475)	510.690
Brockport Normal School, in foundation wall in front of office; bronze tablet stamped "538 B"	539.231
Brockport water tower, on stone foundation, west side; chiseled square	607.83
Sweden Center, 1 mile south of, at Geo. W. Way's residence, in foundation wall under bay window; bronze tablet stamped "639 B"	640.191

SPUR LINES FROM CORRECTED RAILROAD LEVELS OF DOUBTFUL VALUE.

AT BERGEN.

Bergen, West Shore Railroad crossing; top of rail	580.4
Bergen, New York Central and Hudson River Railroad station; top of rail	604.1
Bergen, New York Central and Hudson River Railroad station, in doorstep of baggage room; bronze tablet stamped "604 B"	604.959

SOUTHWARD FROM CHILI STATION (NEW YORK CENTRAL RAILROAD).

Chili station, 380 feet east of, south side of main line of New York Central and Hudson River Railroad, in south end of old culvert abutment at southwest corner of flagman's shanty; bronze tablet stamped "561 B"	562.174
Chili station, 2.5 miles south of, 1.25 miles south of Buckbee Corner, under southeast corner of dwelling house of John Groves, west of road, in foundation wall; bronze tablet stamped "558 B"	559.471

AT CHURCHVILLE.

Churchville, 800 feet east of station; west abutment of New York Central and Hudson River Railroad bridge No. 721 (railroad company's bench mark)	564.57
Churchville, in front of New York Central and Hudson River Railroad station; top of rail	569.0
Churchville, West Shore Railroad crossing; top of rail	569.6
Churchville, Union School building, at right side of main entrance; bronze tablet stamped "615 B"	615.633

ERIE, GENESEE, NIAGARA, AND ORLEANS COUNTIES.

ALBION, LOCKPORT, MEDINA, OAK ORCHARD, OLCOTT, AND RIDGEWAY QUADRANGLES.

The elevations in the following list are based upon a bronze tablet set in the front wall, east of door of Niagara street entrance to Niagara County court-house, at Lockport, stamped "616." The elevation of this bench mark, 615.183 feet above mean sea level, is based on the nearest State engineer's bench mark. This list was previously published in the Appendix to the Eighteenth Annual Report of the Director, United States Geological Survey. The elevations there listed have been corrected by the addition of about 1 foot. The leveling was done in 1896 under the direction of Mr. Frank Sutton, topographer, by Mr. E. L. McNair, levelman. The standard bench marks are stamped without datum letters, but with figures of elevation mostly 1 foot too great.

OLCOTT QUADRANGLE.

LOCKPORT, NORTH 6.5 MILES, THENCE EAST TO HARTLAND, THENCE SOUTH TO GASPORT.

	Feet.
Ridgeroad, 1.5 miles northwest of, on road running east and west, 3 miles north of Wrights Corners, District No. 16, 30 feet southeast of schoolhouse, on granite bowlder, copper bolt stamped "363 ft."	362.466
Hartland, 0.75 mile north of, in front of W. T. Curtiss's house on west side of road, in line of ditch, in granite bowlder nearly embedded in ground; copper bolt stamped "376 ft."	375.21

LOCKPORT QUADRANGLE.

AT GASPORT.

Gasport, Erie Canal bridge No. 152, in north end of east abutment; copper bolt stamped "521 ft."	520.256

LOCKPORT, SOUTHEAST TO DYSINGER CORNERS, THENCE NORTH TO ORANGEPORT.

	Feet.
Lockport, in front of Niagara County court-house, east of main door, Niagara street entrance; bronze tablet stamped "616 ft."	615.183
Dysinger Corners, William Dysinger's red barn, in southwest corner of foundation; bronze tablet stamped "628 ft."	627.697
McNalls Corners, on northwest corner of road crossing, southeast corner of doorstep of large brick house; chiseled square	659.01

AT PENDLETON.

Pendleton, Sulphur Springs guard lock bridge No. 168, in north end of east pier; copper bolt stamped "582 ft."	581.160

BENCH MARKS SET FROM OLD RAILROAD LEVELS, CORRECTED (VALUE DOUBTFUL).

Transit (East Amherst post-office), 700 feet west of station, Batavia and Tonawanda branch of New York Central and Hudson River Railroad, south side of Bridge No. 119, in west abutment next to lower step; copper bolt stamped "587"	588.554
East Clarence, 2,400 feet east of, Batavia and Tonawanda branch of New York Central and Hudson River Railroad bridge No. 114, at south end of east abutment, in coping stone; copper bolt stamped "639"	638.070

RIDGEWAY QUADRANGLE.

ON CIRCUITS TIED TO CANAL BENCH MARKS.

Jeddo, 153 feet from doorway of Adventist Church, 50 feet from doorway of schoolhouse, in road corners in top of bowlder 3.3 feet high; copper bolt stamped "421"	419.927
Oak Orchard, 6 feet from southwest corner of iron bridge across Oak Orchard Creek, 1,000 feet east of post-office, in abutment; copper bolt stamped "370"	369.588
Eagle Harbor, Gaines Town, Erie Canal bridge No. 131, in lower step of east wing, towpath side; copper bolt stamped "516" (Barge canal 516.899)	515.715

MEDINA QUADRANGLE.

ON CIRCUITS TIED TO CANAL BENCH MARKS.

Middleport, Erie Canal bridge No. 145, in north foundation under center of bridge and facing towpath and canal; bronze tablet stamped "519"	518.458
Medina, Prospect Street Bridge No. 140, lower step, east end, north side of Erie Canal; copper bolt stamped "518"	517.189

ELEVATIONS DETERMINED FROM NEW YORK STATE SURVEY LEVELS OF 1883, CORRECTED.

East Shelby, at southwest corner of Methodist Episcopal Church, in bowlder; copper bolt stamped "668"	667.547
Shelby Town, 125 feet north of Coons Bridge, east side of road between East and West Shelby, in top of bowlder 3 feet high; copper bolt stamped "616"	615.756
Wheatville, 200 feet north of road crossing, 3 feet east of fence line, under northwest corner of red barn of John Waterstreet, in granite bowlder; copper bolt stamped "669"	668.182
Alabama station, 4 miles northwest of, 0.2 mile north of Tonawanda Creek, north side of gate entrance to feeder, in second step of east abutment; copper bolt stamped "622"	621.160

BENCH MARKS SET FROM OLD RAILROAD LEVELS, CORRECTED (VALUE DOUBTFUL).

Pembroke, 1,550 feet east of railroad station, Batavia and Tonawanda branch of the New York Central and Hudson River Railroad, on coping stone of east abutment of Bridge No. 104, south side of track; copper bolt stamped "823"	822.780
East Pembroke, 1 mile north of, 630 feet north of corner, east side of north and south road, on land belonging to E. H. Clark, in bowlder 6 feet square deeply embedded in ground; copper bolt stamped "873 ft."	872.140

OAK ORCHARD QUADRANGLE.

ON CIRCUITS TIED TO CANAL BENCH MARKS.

Fairhaven, 1,200 feet south of, on east side of road to Albion, in top of stone masonry wall in front of Mrs. Dixon's house; copper bolt stamped "439"	438.206
East Gaines, 1 mile east by 1 mile south of W. H. Banker's house, on west side of Transit road, 600 feet north of Murray and Gaines Baptist Church, in dooryard 12 feet south of dwelling, in stone 3 feet square and 1.5 feet high; copper bolt stamped "458"	457.114
Murray, 610 feet north of road crossing on west side of road, 81 feet southwest of stone schoolhouse, *in bowlder 3 feet* wide and 2 feet high; copper bolt stamped "410"	409.458

ALBION QUADRANGLE.

BENCH MARKS TIED TO CANAL BENCH MARKS.

	Feet.
Albion, Orleans House, corner of Platt and Bank streets, 40.5 feet from Banks street corner, on Platt street side, 7.7 feet from office door; bronze tablet stamped "521"	519.984
Holley, Webster warehouse, south and west of Erie Canal bridge No. 115, in doorsill of door on canal side; copper bolt stamped "514"	513.210

ELEVATIONS DETERMINED FROM NEW YORK STATE SURVEY LEVELS, CORRECTED.

Clarendon, 4 miles south of, opposite Andrew Kuhn's house on land belonging to Mrs. Butcher, 0.33 mile north of county line, in granite bowlder; copper bolt stamped "648"	647.137
Elba, 3.8 miles northeast of, at southwest corner of junction of east and west road and road south to East Elba, in granite bowlder; copper bolt stamped "675"	674.637
East Oakfield, 1.5 miles east of, 65 feet southeast of schoolhouse, District No. 9, 15 feet from road corner, on west side of north road, in bowlder; copper bolt stamped "709"	708.143
South Barre, 220 feet east of road crossing, in stone doorsill of schoolhouse, District No. 9; copper bolt stamped "652"	651.645
Barre Center, 3 miles southwest of, 1.5 miles northeast of West Barre, E. E. Allis's house, on north side of road, in lower of three stone steps of eastern front door; copper bolt stamped "666"	665.304

BENCH MARK SET FROM OLD RAILROAD LEVELS, CORRECTED (VALUE DOUBTFUL).

South Byron, 1,710 feet west of railroad station, 27 feet north from center of north track of New York Central and Hudson River Railroad, in next to upper step of large culvert, across Black Creek; copper bolt stamped "682"	681.165

ERIE COUNTY.

EDEN, GOWANDA, AND HOLLAND QUADRANGLES.

The leveling on Holland and part of Eden was done in 1904 under the direction of Mr. J. H. Jennings, topographer, by Mr. I. W. Petit, levelman, and that on Gowanda and remainder of Eden was done in 1905 under the direction of Mr. Gilbert Young, topographer, by Mr. R. P. Thompson, levelman. Standard bench marks are stamped "ADJ 1903" in addition to the figures of elevation.

EDEN QUADRANGLE.

BLAISDELL, SOUTH ALONG THE PENNSYLVANIA RAILROAD VIA HAMBURG, TO COLLINS STATION.

	Feet.
Hamburg, in stone foundation at northwest corner of Kopp's Hotel, at end of car line; bronze tablet stamped "826 ALBANY 1903 ADJ"	825.555
Water Valley, Erie Railroad; top of rail	790.6
Eden Valley station, 300 feet east of Erie station, in northwest corner of foundation of Albert Dagle's house; bronze tablet stamped "792 ALBANY ADJ 1903"	792.254
Eden Center, northeast corner of foundation of schoolhouse; bronze tablet stamped "ALBANY 828 ADJ 1903"	827.573
North Collins, Erie Railroad station, in east face of southeast corner; bronze tablet stamped "847 ADJ 1903"	847.023
Lawton, in west face of foundation wall of E. H. Lawton & Son's store; bronze tablet stamped "826 ADJ 1903"	825.640

HAMBURG, ALONG HIGHWAY SOUTHEAST TO BOSTON CENTER.

North Boston, 3.7 miles east of Hamburg, on northwest corner of south abutment of bridge over Idlewood (or Eighteenmile) Creek; bronze tablet stamped "818 ALBANY 1903 ADJ".	817.517

BOSTON, SOUTH TO MORTONS CORNERS, THENCE WEST TO LAWTON.

New Oregon, 100 feet northwest of crossroads, in southeast corner of foundation of Peter Kirsch's house; bronze tablet stamped "1075 ADJ 1903"	1,075.137
Woodwards Hollow, in east face of foundation wall of F. J. Ryther's store; bronze tablet stamped "1305 ADJ 1903"	1,304.850
Mortons Corners, 500 feet west of, 106 feet from corner of Martha Schabehorn's house, 77 feet from Helen Briggs's house, and 151.42 feet from Emily Sampson's house; iron post (primary-traverse station No. 134) stamped "1389 ADJ 1903"	1,389.046
Whites Corners, 0.9 mile west of, in dooryard at northwest corner of dwelling house occupied by Mr. Christopher Naegle, on south side of road; primary-traverse iron post stamped "11 5 ADJ 1903"	1,114.399

GOWANDA QUADRANGLE.

COLLINS STATION, ALONG THE PENNSYLVANIA RAILROAD, TO DAYTON

	Feet.
Collins station, in southeast corner of building owned by F. Mathan, in water table; bronze tablet stamped "875 ADJ 1903"	875.150

HOLLAND QUADRANGLE.

BOSTON CENTER, SOUTH TO BOSTON.

Boston Center (Patchin), opposite Michael Flickgenar's grocery, on large bowlder; bronze tablet stamped "903 ALBANY 1903 ADJ"	903.048
Boston, 135 feet north of Iroquois Hotel, in grass plat at intersection of roads; iron post stamped "941 ALBANY"	940.964

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[Bulletin No. 281.]

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